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DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 171, 172, 173, 174, 175, 176, and 177

[Docket No. PHMSA-2018-0081 (HM-250A)]

RIN 2137-AF42

Hazardous Materials: Compatibility with the Regulations of the International Atomic Energy Agency

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: PHMSA, in coordination with the Nuclear Regulatory Commission, proposes to amend the Hazardous Materials Regulations to maintain alignment with international regulations and standards governing the transportation of Class 7 radioactive materials. Specifically, PHMSA proposes to adopt changes contained in the International Atomic Energy Agency standards. Additionally, PHMSA proposes regulatory amendments identified through internal regulatory review processes to update, clarify, correct, or streamline certain regulatory requirements applicable to the transportation of Class 7 (radioactive) materials.

DATES: Comments must be received by [INSERT DATE 90 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]. To the extent possible, PHMSA will consider late-filed comments as a final rule is developed.

ADDRESSES: You may submit comments by any of the following methods:

- *Federal Rulemaking Portal:* <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- *Fax:* 1-202-493-2251.
- *Mail:* Docket Management System

- U.S. Department of Transportation, Docket Operations, M-30, Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590-0001.
- *Hand Delivery:* U.S. Department of Transportation, Docket Operations, M-30, Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590-0001 between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Instructions: Include the agency name and docket number PHMSA-2018-0081 (HM-250A) or RIN 2137-AF42 for this rulemaking at the beginning of your comment. Note that all comments received will be posted without change to <http://www.regulations.gov>, including any personal information provided. If sent by mail, comments must be submitted in duplicate. Persons wishing to receive confirmation of receipt of their comments must include a self-addressed stamped postcard.

Docket: For access to the dockets to read background documents or comments received, go to <http://www.regulations.gov> or the DOT Docket Operations Office (*see ADDRESSES*).

Confidential Business Information: Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA; 5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN” for “proprietary information.” Submissions containing CBI should be sent to Alexander Wolcott, U.S. Department of Transportation, 1200 New Jersey Avenue SE, Washington, DC 20590-0001. Any commentary that PHMSA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

FOR FURTHER INFORMATION CONTACT: Alexander Wolcott, Standards and

Rulemaking Division, (202) 366-8553, or Rick Boyle, Engineering and Research Division, (202) 366-2993, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, Washington, DC 20590-0001.

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I. Executive Summary

PHMSA, in coordination with the Nuclear Regulatory Commission (NRC), proposes to amend certain provisions of the Hazardous Materials Regulations (HMR; 49 CFR parts 171 to 180) to maintain alignment with International Atomic Energy Agency (IAEA) regulations and standards. Additionally, PHMSA proposes regulatory amendments identified through internal regulatory review processes to update, clarify, correct, or streamline certain regulatory requirements applicable to the transportation of Class 7 radioactive materials.

PHMSA expects adoption of the regulatory amendments proposed in this NPRM will

maintain the high safety standard currently achieved under the HMR. PHMSA also notes that—insofar as harmonization of the HMR with international consensus standards as proposed could reduce delays and interruptions of hazardous materials shipments during transportation—the proposed amendments may also lower greenhouse gas (GHG) emissions and safety risks to minority, low-income, underserved, and other disadvantaged populations, and communities in the vicinity of interim storage sites and transportation arteries and hubs.

The following list summarizes the more noteworthy proposals set forth in this NPRM:

- *Incorporation by Reference*: PHMSA proposes to incorporate by reference IAEA’s 2018 Edition of Regulations for the Safe Transport of Radioactive Material, Safety Standards Series No. SSR-6 (Rev.1); American National Standard Institute’s (ANSI) N14.1 Uranium Hexafluoride—Packaging for Transport, 2012 Edition; and ANSI’s N14.1 Uranium Hexafluoride—Packaging for Transport, 2019 Edition.
- *Scope and Applicability of Subpart I (Radioactive Materials Packaging Requirements)*: PHMSA proposes to except certain shipments from the requirements of subpart I of the HMR by amending § 173.401. First, PHMSA proposes to amend § 173.401(b)(4) to specify that § 173.401 does not apply to all natural material and ores containing naturally-occurring radionuclides regardless of the intended use, provided the activity concentration of the material does not exceed 10 times the exempt material activity concentration values specified in § 173.436, or as determined in accordance with the requirements of § 173.433. Currently, only natural materials and ores processed for purposes other than extraction of the radionuclides are excepted in § 173.401(b). As written, the HMR treats identical radioactive materials differently based on the intended use and not the hazard presented. Second, PHMSA proposes to revise § 173.401(b)(2) to provide an exception for a person being transported for medical treatment because of accidental or deliberate intake of radioactive material, or because of contamination. Currently, § 173.401 provides an exception from subpart I for radioactive materials

implanted into people or animals for diagnosis or treatment, but not for radioactive material present in or on an individual due to contamination. The second proposed amendment would address these additional circumstances and facilitate the transportation of people and their effects—such as clothing or other items on their person—who have been contaminated and need to be transported for medical treatment.

- *Surface Contaminated Object –III (SCO-III)*: PHMSA proposes to revise the definition for “Surface Contaminated Object” (SCO) in § 173.403 to include “SCO-III.” This new form of surface contaminated object is meant for large solid objects (e.g., a steam generator, reactor coolant pump, pressurizer, or reactor head component, etc.) that cannot be transported in a package. The requirements for transporting SCO-III material are proposed in § 173.427. Currently, such shipments can only be transported using a DOT special permit.
- *Aging of Packages*: PHMSA proposes to amend § 173.410 to require package manufacturers to consider the effects of aging during the design process. The proposed language requires manufacturers to evaluate the potential degradation phenomena over time, such as corrosion, abrasion, fatigue, crack propagation, changes of material compositions or mechanical properties due to thermal loadings or radiation, generation of decomposition gas, as well as their impact on the functions important to safety. Package engineers already consider these factors when they design radioactive packages; however, there is no specific requirement related to the aging of packaging designs. The codification of this best practice would help to ensure that radioactive packagings remain safe throughout their life cycle.

PHMSA expects that some of the proposed amendments represent improvements in safety—e.g., transport index limits and packaging aging—while none would have significant negative impacts on public safety or the environment. Additionally, PHMSA anticipates safety benefits from improved compliance related to consistency between domestic and international

regulations. PHMSA solicits comment on the amendments proposed in this NPRM, specifically the: (1) need for the proposals, including benefits and costs of those actions; (2) potential impacts on safety and the environment; impact on environmental justice and equity; and (3) any other relevant information. In addition, PHMSA solicits comment regarding approaches to reducing the costs of this rulemaking while maintaining or increasing safety benefits. In its preliminary regulatory impact analysis (PRIA), PHMSA concluded that the aggregate benefits of the amendments proposed in this NPRM justify their aggregate costs. Nonetheless, PHMSA solicits comment on specific changes (e.g., greater flexibility for a particular proposal) that might improve the safe transportation of radioactive materials.

II. Background

The Federal Hazardous Materials Transportation Act (codified at 49 U.S.C. 5101 *et seq.*) directs PHMSA to participate in relevant international standard-setting bodies and encourages alignment of the HMR with international transport standards consistent with the promotion of safety and the public interest.¹ This statutory mandate reflects the importance of international standard-setting activity when considering the globalization of commercial transportation of hazardous materials. Harmonization of the HMR with international transport standards, as appropriate, can reduce the costs and other burdens of complying with multiple or inconsistent safety requirements. Consistency between the HMR and current international standards can also enhance safety by: (1) ensuring that the HMR is informed by the latest best practices and lessons learned; (2) improving understanding of and compliance with pertinent requirements; (3) facilitating the smooth flow of hazardous materials from their points of origin to their points of destination, thereby avoiding risks to the public and the environment from the release of hazardous materials due to delays or interruptions in the transportation of those materials; and (4) enabling consistent emergency response procedures in the event of a hazardous materials

¹ See 49 U.S.C. 5120.

incident.

Under their respective statutory authorities, PHMSA and the NRC jointly regulate the transportation of radioactive materials to, from, and within the United States. In accordance with the 1979 Memorandum of Understanding (MOU)² between DOT and NRC:

- PHMSA regulates both shippers and carriers with respect to:
 - packaging requirements;
 - communication requirements for:
 - shipping paper contents;
 - package labeling and marking;
 - vehicle placarding; and
 - training and emergency response requirements.
- NRC requires its licensees to satisfy requirements to protect public health and safety, to assure the common defense and security, and:
 - certifies Type B and fissile material package designs and approves package quality assurance programs for its licensees;
 - provides technical support to PHMSA and works with PHMSA to ensure consistency with respect to the transportation of Class 7 (radioactive) materials; and
 - conducts inspections of licensees and an enforcement program within its jurisdiction to assure compliance with its requirements.

Historically, PHMSA and NRC—and their predecessor agencies—have, to the extent practicable, harmonized their respective regulations to maintain compatibility with the IAEA’s regulations. The Safety Series No. 6, “Regulations for the Safe Transport of Radioactive Material,” was first published by IAEA in 1961 and revised in 1964, and again in 1967. On

² 44 FR 38690. A copy of the MOU has been placed in the docket for this rulemaking at www.regulations.gov.

October 4, 1968, DOT adopted harmonizing amendments to the HMR.³ Additional revisions were made by IAEA in 1973 and 1985, and DOT then codified these revisions in the HMR.⁴ IAEA completed a major revision to the Safety Series No. 6—renamed “Regulations for the Safe Transport of Radioactive Material, 1996 Edition, No. ST-1”—in 1996 and later republished it in 2000 to include minor editorial changes, at which time the previous designation was changed to “Regulations for the Safe Transport of Radioactive Material, 1996 Edition, No. TS-R-1, (ST-1, Revised).” On January 26, 2004, PHMSA adopted harmonizing amendments to the HMR.⁵ Then, on July 11, 2014, PHMSA adopted the updates of the 2003, 2005 and 2009 editions in the HMR.⁶ Finally, on January 8, 2015, PHMSA incorporated by reference the 2012 edition of the SSR,⁷ but did not fully harmonize the HMR’s requirements with the changes made in that edition.

In this NPRM, PHMSA proposes to amend the HMR to align with the sections of 2012 SSR-6 the HMR do not currently harmonize with and 2018 SSR-6, (Rev. 1), which includes changes made to the IAEA regulations since PHMSA’s rulemaking in 2014.⁸ Furthermore, PHMSA proposes to incorporate by reference 2018 SSR-6, (Rev. 1) and the 2012 and 2019 editions of ANSI N14.1: Uranium Hexafluoride—Packaging for Transport. Additionally, PHMSA proposes regulatory amendments identified through internal regulatory review processes to update, clarify, correct, or streamline certain regulatory requirements applicable to the transportation of Class 7 (radioactive) materials.

PHMSA is working closely with NRC in the development of this rulemaking and anticipates that NRC will publish a parallel rulemaking. PHMSA and NRC will coordinate the development and publication schedules for the final rules and, if necessary, PHMSA may issue a supplemental notice of proposed rulemaking to ensure that the DOT and NRC rules are

³ 33 FR 14918.

⁴ 48 FR 10218 (Mar. 10, 1983) and 60 FR 50291 (Sep. 28, 1995).

⁵ 69 FR 3632.

⁶ 79 FR 40589.

⁷ 80 FR 1075.

⁸ 79 FR 40589.

compatible.

This NPRM addresses only the areas for which DOT has jurisdiction as defined in the MOU with NRC. Comments responding to any parallel NRC NPRM should be submitted in accordance with the public participation guidelines established by NRC in 10 CFR Part 2 subpart H.

III. Incorporation by Reference Discussion Under 1 CFR Part 51

According to the Office of Management and Budget's (OMB) Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities," government agencies must use voluntary consensus standards wherever practical in the development of regulations.

PHMSA currently incorporates by reference into the HMR all or the relevant parts of several standards and specifications developed and published by standard development organizations (SDO). In general, SDOs update and revise their published standards every two to five years to reflect modern technology and best technical practices. The National Technology Transfer and Advancement Act of 1995 (NTTAA; Pub. L. 104-113) directs Federal agencies to use standards developed by voluntary consensus standards bodies in lieu of government-written standards unless to do so would be inconsistent with applicable law or otherwise impracticable. Voluntary consensus standards bodies develop, establish, or coordinate technical standards using agreed-upon procedures. OMB issued Circular A-119 to implement section 12(d) of the NTTAA relative to the utilization of consensus technical standards by Federal agencies. This circular provides guidance for agencies participating in voluntary consensus standards bodies and describes procedures for satisfying the reporting requirements in the NTTAA. Consistent with the requirements of the NTTAA and its statutory authorities, PHMSA is responsible for determining which standards should be updated, revised, removed, or added to the HMR. Revisions to materials incorporated by reference in the HMR are handled via the rulemaking

process, which allows the public and regulated entities to provide input. During the rulemaking process, PHMSA must also obtain approval from the Office of the Federal Register to incorporate by reference any new materials. Regulations of the Office of the Federal Register require that agencies detail in the preamble of an NPRM the ways the materials it proposes to incorporate by reference are reasonably available to interested parties, or how the agency worked to make those materials reasonably available to interested parties. (*See* 1 CFR 51.5.)

PHMSA proposes to incorporate by reference “Specific Safety Requirements Number SSR-6, Revision 1: Regulations for the Safe Transport of Radioactive Material 2018 Edition” (2018 SSR-6, Rev. 1) and the 2012 and 2019 editions of ANSI N14.1: Uranium Hexafluoride—Packaging for Transport. A summary and discussion of these standards can be found in “V. Section-by-Section Review” under § 171.7. The IAEA regulations are free and easily accessible to the public on the internet, with access provided through the parent organization website at: <https://www.iaea.org/publications/12288/regulations-for-the-safe-transport-of-radioactive-material>. The 2012 and 2019 editions of ANSI N14.1 are available for purchase on the ANSI website at: <https://webstore.ansi.org/Standards/PCC/ANSIN142012> and <https://webstore.ansi.org/Standards/PCC/ANSIN142019> respectively.

IV. Overview of Proposed Amendments

PHMSA proposes amendments to the HMR based on updates to the 2012 and 2018 editions of the IAEA Safety Standards: 2012 SSR-6 and 2018 SSR-6, Rev. 1. As proposed, the amendments would continue to maintain compatibility between the HMR and the IAEA regulations. PHMSA does not intend to make the HMR identical to the IAEA regulations but, rather, to remove or avoid potential barriers to international commerce while adhering to domestic law, reflecting domestic practices, and maintaining public health and safety. Accordingly, PHMSA is not proposing to adopt all the recent updates into the HMR because the framework or structure of the HMR may make adoption unnecessary or impractical. In such

cases, there is no added benefit to safety that might outweigh the impracticality of adoption.

A. Amendments to Harmonize with the 2012 SSR-6 and 2018 SSR-6, Rev. 1

In consideration of updates in 2012 SSR-6 and 2018 SSR-6, Rev. 1, PHMSA proposes to amend the HMR as follows:

- Revise paragraph § 171.7(s) to incorporate by reference the revised 2018 SSR-6, Rev. 1 into the HMR.
- Revise § 172.101 to add the new SCO-III, so that the proper shipping name of UN2913 reads “Radioactive Material, surface contaminated objects (SCO-I, SCO-II, *or* SCO-III) in the Hazardous Materials Table (HMT).
- Add new language to § 172.203(d)(4) and (5) to allow for the label type and transport index of overpacks to be listed on shipping papers.
- Clarify § 172.310 to state that markings on a package that do not relate to the material in the package must be removed or covered before shipment.
- Add a provision to § 173.401(b)(2) to include persons contaminated by radioactive material transported for medical treatment.
- Add a new term “dose rate” in § 173.403.
- Revise the definition of *Low specific activity (LSA) material* in § 173.403 to remove the leaching prevention requirement for LSA-III material.
- Revise the definition of Special Form Class 7 (radioactive) in § 173.403 to adopt a newer standard for the design of these materials.
- Revise the definition of *Surface Contaminated Object (SCO)* in § 173.403 to add a new SCO-III material.
- Revise § 173.410(i)(3) to require that all Class 7 materials — not just liquids — be capable of withstanding an internal pressure that produces a pressure differential of not less than the maximum normal operating pressure plus 95 kPa.

- Add a new paragraph (j) to § 173.410 to require that aging be considered when designing packages for Class 7 materials.
- Amend § 173.417(a) to allow the import and export of fissile material packages that meet IAEA requirements for criticality safety index control without package certification by Competent Authorities.
- Add requirements to § 173.427 for the new SCO-III materials, including a new § 173.427(d) to require vehicles transporting the new SCO-III materials be properly surveyed for residual radioactivity after each shipment.
- Add a new paragraph (i) to § 173.433 to allow a stakeholder to apply for an approval to allow certain instruments or articles to have an alternative activity limit.
- Add seven new radionuclides to the Table of A_1 and A_2 values for radionuclides. in § 173.435.
- Add seven new radionuclides to the Table of Exempt material activity concentrations and exempt consignment activity limits for radionuclides in § 173.436.
- Add reference in § 173.443 to the new § 173.427(d) to require vehicles transporting the new SCO-III materials be properly surveyed for residual radioactivity after each shipment.
- Revise § 173.448 to require overpacks to be marked with the name and address of the consigner and consignee if this information cannot be seen on the packages.
- Amend § 173.453(d) to add another condition to the existing exception to require fissile material be distributed homogeneously and not form a lattice arrangement within the package.
- Add a new paragraph (g) to § 173.453 to allow a fissile material exception for packages containing up to 3.5 grams of uranium-235 where the uranium-235 is not more than 5 percent of the material.
- Add a new paragraph (h) to § 173.453 to allow an exception for up to 140 grams fissile

nuclides when shipped under exclusive use.

- Add a new paragraph (j) to § 173.475 to require proper maintenance of shipments of Class 7 materials while in storage.

B. Other Proposed Amendments

In addition to the amendments proposed for harmonization with 2012 SSR-6 and 2018 SSR-6, Rev. 1, PHMSA proposes the following regulatory amendments identified through internal regulatory review processes to update, clarify, correct, or streamline certain regulatory requirements applicable to the transportation of Class 7 (radioactive) materials:

- Revise paragraph (d) of § 171.7 to remove reference to § 173.417 and add the 2012 and 2019 editions of ANSI N14.1: Uranium Hexafluoride—Packaging for Transport.
- Amend the § 172.101 HMT to remove the reference to § 173.427 from columns 8B and 8C for “UN2978, Radioactive material, uranium hexafluoride.”
- Amend § 172.102(c)(1) to remove the reference to § 173.472, which is proposed to be deleted.
- Amend paragraph (d) of § 172.203 to require a list of the fissile nuclides contained in a package be included on a shipping paper.
- Add new language to § 173.415 to clarify documentation requirements.
- Add new language to § 173.417 to provide a provision for fissile material when offered for import or export.
- Add new language to § 173.420 to reference § 173.477 which is the relevant packaging section for the material.
- Add new language to § 173.420 to reference § 171.7 where American National Standard N14.1 is referenced.
- Revise § 173.424 to correct a referenced section and allow transport of packages that contain fissile material only if excepted by § 173.453.

- Revise § 173.431(b) to remove the reference to § 173.472, which is proposed to be deleted.
- Add a clarification to footnote “b” of § 173.436 to state that in the case of Th-natural, the parent nuclide is Th-232, and in the case of U-natural the parent nuclide is U-238.
- Add a new paragraph to § 173.447. Paragraph (b) will be redesignated as (c), and new paragraph (b) will be added, which will limit groups of Class 7 (radioactive) packages to a transport index of 50 and require a minimum distance of 6 meters (20ft) between groups of packages.
- Remove § 173.472 because Type B packages were previously removed from the HMR.
- Revise the leakage and contamination sections of the modal-specific requirements, specifically—§§ 174.750, 175.705, 176.715, and 177.843—to reference the existing § 173.443(e).

C. Amendments Not Being Considered for Proposal

PHMSA is not proposing to adopt all the updates made to the IAEA regulations since 2012 into the HMR. In many cases, amendments to the IAEA standards are not proposed for adoption because the framework or structure of the HMR makes adoption unnecessary or impractical. Below is a listing of significant amendments to the IAEA regulations made since PHMSA’s 2014 rulemaking that are not being proposed for adoption at this time.

- PHMSA is not replacing the term “radiation level” with “dose rate” throughout the HMR because the term “dose rate” is already used in the HMR as a synonym for “radiation level.” Instead, PHMSA proposes to add a definition for “dose rate” that will duplicate the current HMR definition for “radiation level.”
- PHMSA is not adopting all of the changes in the IAEA fissile material exceptions in SSR-6 paragraphs 417 and 674 for material shipped with beryllium, hydrogenous material enriched in deuterium, graphite, and other allotropic forms of carbon (except for

international shipments), and paragraph 675, which exempted certain plutonium shipments from some packaging requirements. Instead, PHMSA proposes to adopt changes consistent with the changes that NRC has identified in the Regulatory Basis for NRC Docket 2016-0179.

V. Section-by-Section Review

A. Part 171

SECTION 171.7

Section 171.7 provides a listing of all voluntary consensus standards incorporated by reference into the HMR. PHMSA proposes to incorporate by reference “Specific Safety Requirements Number SSR-6, Revision 1: Regulations for the Safe Transport of Radioactive Material 2018 Edition” (2018 SSR-6, Rev. 1) and the 2012 and 2019 editions of ANSI N14.1: Uranium Hexafluoride—Packaging for Transport. IAEA’s SSR-6 Rev.1 regulates the transportation of radioactive materials internationally. PHMSA evaluated the updated standards and determined that the revisions provide an enhanced level of safety without imposing significant compliance burdens. These standards have well-established and documented safety histories, and their adoption will maintain the high safety standard currently achieved under the HMR.

Therefore, PHMSA proposes to add or revise the following incorporation by reference materials:

- In paragraph (d), remove reference to § 173.417 and incorporate by reference the 2012 and 2019 editions of ANSI N14.1: Uranium Hexafluoride—Packaging for Transport in addition to the versions currently listed in § 171.7(d). PHMSA proposes to remove the reference to § 173.417 from this paragraph because § 173.417 does not reference the ANSI N14.1 standard. The language in § 173.417 pertains to shipments of less than 0.1 kg of uranium hexafluoride while ANSI N14.1 only pertains to shipments exceeding 0.1

kg and those requirements are found in the other listed section, see § 173.420. The new editions of ANSI N14.1 provide criteria for packaging uranium hexafluoride for transportation and cover design and fabrication of the packaging, service inspection requirements, cleanliness, maintenance requirements, and cylinder loading requirements. PHMSA has incorporated this standard in its regulations since 1971, and it remains the industry standard for shipping uranium hexafluoride. The changes from the 2001 version to the proposed 2019 version include requirements for the use of “plugs” that were not previously allowed and provisions for converting imperial units to metric, as well as harmonization with the 2018 SSR-6, Rev. 1 and additional best practices including incorporating standards from ASTM International. PHMSA believes that the 2019 edition adds an increased level of safety by bringing in updated safety requirements, while allowing more flexibility in packaging. While the 2019 edition of ANSI N14.1 will be the required standard for new uranium hexafluoride packages, older packages may remain in service provided that repairs, markings, and periodic tests and inspections comply with the 2019 edition. The changes to the inspection, testing, and repair requirements between the 2001 and 2019 editions are largely formatting changes, and PHMSA does not believe that the revisions will necessitate the removal of existing packaging from circulation. Further, by incorporating both the proposed editions, packages built to the 2012 edition will be permitted in accordance with § 173.420. However, new packages will still need to be manufactured to the 2019 standard. The ANSI N14.1: Uranium Hexafluoride—Packaging for Transport 2012 and 2019 editions are available for purchase at the following websites:

- 2012 Edition: <https://webstore.ansi.org/standards/pcc/ansin142012>
- 2019 Edition: <https://webstore.ansi.org/standards/pcc/ansin142019>
- In paragraph (s)(1), incorporate by reference the 2018 edition of the IAEA Regulations for the Safe Transport of Radioactive Material, Safety Standards Series No. SSR-6

(Rev.1), to replace the 2012 edition, which is currently referenced in §§ 171.22; 171.23; 171.26; 173.415; 173.416; 173.417; 173.435; and 173.473. The IAEA regulations establish standards of safety for control of the radiation, criticality, and thermal hazards to people, property, and the environment associated with the transport of radioactive materials. Notable changes from the previous edition include clarification of marking requirements, a new group of surface contaminated objects (SCO-III) for UN2913, and amendments to basic radionuclide values (activity of the radionuclide as listed in § 173.435) for seven specific radionuclides (Ba-135m, Ge-69, Ir-193m, Ni-57, Sr-83, Tb-149 and Tb-161). The Regulations for the Safe Transport of Radioactive Material are available for download and purchase in hard copy on the IAEA web site at:

<https://www.iaea.org/publications/12288/regulations-for-the-safe-transport-of-radioactive-material>.

B. Part 172

SECTION 172.101 HMT

The HMT provides the terms and conditions governing transportation of hazardous materials under the HMR. For each entry, the HMT identifies information such as the proper shipping name, UN identification number, and hazard class. The HMT specifies additional information or reference requirements in the HMR such as hazard communication, packaging, quantity limits aboard aircraft, and stowage of hazardous materials aboard vessels. PHMSA proposes to revise the entry for “UN2978, Radioactive material, uranium hexafluoride” to remove the reference to § 173.427, and revise the entry for “UN2913, Radioactive material, surface contaminated objects (SCO-I *or* SCO-II)” to add the new SCO-III material.

In the July 11, 2014, final rule,⁹ PHMSA added paragraph (e) to § 173.420, which details additional shipping requirements for shipments of Uranium hexafluoride (UF₆) and requires the

⁹ 81 FR 40590.

UN number and proper shipping name—“UN2978, Radioactive material, uranium hexafluoride”—to be used for packages containing 0.1 kg or more of non-fissile or fissile-excepted UF₆. Paragraph (e) was added to clarify that “when there is more than one way to describe a UF₆ shipment, the proper shipping name and UN number for the uranium hexafluoride should take precedence over the shipping description for LSA material.” However, PHMSA inadvertently failed to remove the reference to § 173.427 (regarding, in relevant part, transport requirements for LSA material) from the non-bulk and bulk packaging provisions in the 2014 final rule. The HMT entry for “UN2978” should reference only § 173.420 (regarding requirements for uranium hexafluoride). Compliance with the HMT as written could result in the use of an incorrect packaging provision, a safety concern that could lead to a dangerous situation. Therefore, PHMSA proposes to amend the entry for “UN2978, Radioactive material, uranium hexafluoride” to remove the reference to § 173.427 and ensure proper packaging is used and safety is maintained.

Additionally, PHMSA proposes to change the parenthetical text in the entry for “UN2913, Radioactive material, surface contaminated objects (SCO-I *or* SCO-II)” to read “(SCO-I *or* SCO-II *or* SCO-III).” This change is consistent with the addition of the new SCO-III material discussed in this NPRM. *See* SECTIONS 173.403 and 173.427 of the Section-by-Section Review for further details on this proposed change.

SECTION 172.102 Special Provisions

Section 172.102 lists special provisions applicable to the transportation of specific hazardous materials and contains various provisions including packaging requirements, prohibitions, and exceptions applicable to particular quantities or forms of such hazardous materials. PHMSA proposes to amend special provision 139 to remove the reference to § 173.472 because in this NPRM, PHMSA proposes to remove § 173.472 from the HMR. *See* SECTION 173.472 of the Section-by-Section Review for further details.

SECTION 172.203

Section 172.203 prescribes additional requirements for shipping descriptions on shipping papers. Paragraph (d) lists information that must be included in the description of a Class 7 (radioactive) material, such as the category of label applied to a package as referenced in paragraph (d)(4). PHMSA proposes to revise paragraphs (d)(4) and (5) by adding the words “or overpack” to those paragraphs. This proposed change would allow shippers to list the label and the sum of the transport indices of the overpack on the shipping paper, instead of the individual packages. PHMSA believes that this change would provide cost savings without compromising safety by reducing the time it takes for an offeror to fill out a shipping paper. This change would also harmonize with the IAEA standards and account for the common use of overpacks for shipping Class 7 (radioactive) materials.

Additionally, PHMSA proposes to revise paragraph (d)(6) to require shipping papers for shipments containing fissile Class 7 (radioactive) material to list the nuclides of the fissile material in the package. This proposed change would provide information on which fissile nuclides are present in the package—e.g., plutonium-239, plutonium-241, uranium-233, or uranium-235—but would only affect shipments where the fissile nuclides are not listed on the shipping paper in accordance with the requirements of § 173.433(g), and the fissile materials are not excepted under § 173.453. As the HMR is currently written, it is possible that such a package could be assigned a criticality safety index (CSI), but have no fissile nuclides listed on the shipping paper as it does not meet the threshold set out in § 173.433. A CSI is assigned to fissile materials using a calculation in 10 CFR part 71 to provide control over the accumulation of packages, overpacks, or freight containers containing fissile material. As this may lead to confusion in transportation and possibly delay shipments, we have proposed this revision to paragraph (d)(6).

SECTION 172.310

Section 172.310 prescribes marking requirements for packages containing Class 7 (radioactive) materials. Specifically, paragraph (b) requires that each industrial, Type A, Type B(U), or Type B(M) package must be legibly and durably marked on the outside of the packaging. PHMSA proposes to make a revision to paragraph (b) which clarifies the existing requirement to remove markings that do not correspond with the package being shipped. For example, if an offeror's package meets the requirements for a Type A package and radioactive materials are then removed, any markings identifying the package as a Type A package must be removed or covered. Improperly labeled packages misrepresent the hazard present in the package, which could lead to potentially dangerous situations, especially if the label underrepresents the hazard present. This proposed clarification will increase compliance and decrease the likelihood of a dangerous situation occurring, thus improving the safe transportation of these packages.

Additionally, PHMSA proposes to revise paragraph (e) to remove reference to § 173.472 to reflect the proposal to remove § 173.472 from the HMR. *See* SECTION 173.472 of the Section-by-Section Review for further details.

C. Part 173

SECTION 173.401

Section 173.401 contains the scope of subpart I of Part 173 of the HMR, including situations that are excepted from the requirements of subpart I. Sub-paragraph 107(d) of the IAEA regulations contains an exception for radioactive material in—or on—a person who is to be transported for medical treatment because of accidental or deliberate radiation intake or contamination. Currently, § 173.401(b)(2) of the HMR provides an exception from subpart I of Part 173 for radioactive material implanted into people or animals for diagnosis or treatment, but not from contamination. Therefore, PHMSA proposes to add a new paragraph (b)(6) for a

medical exception to § 173.401, which would facilitate the transportation of people and their effects—such as clothing or other items on their person—who have been contaminated and need to be transported for medical treatment.

Additionally, PHMSA proposes to revise § 173.401(b)(4) to specify that § 173.401 does not apply to all natural material and ores containing naturally occurring radionuclides, regardless of its intended use, provided the activity concentration of the material does not exceed 10 times the exempt material activity concentration values specified in § 173.436, or determined in accordance with the requirements of § 173.433. Currently, only natural material and ore containing naturally occurring radionuclides—which are either in their natural state or which have only been processed for purposes other than extraction of the radionuclides—are excepted from subpart I of Part 173 in § 173.401(b). Material intended to be processed for the use of the radionuclides may not utilize the exception. As written, the HMR treats identical radioactive material differently based on its intended use and not the hazard it presents. This change maintains the existing activity concentration limit of 10 times the exempt material activity concentration values specified in § 173.436 meaning the hazard level of the material exempted cannot exceed what is already permitted. Therefore, this proposed change would harmonize with the scope of the IAEA regulations and reflect that the hazards of naturally occurring radionuclides do not differ based on the reason for processing or their future intended use.

SECTION 173.403

Section 173.403 provides the definitions for subpart I of Part 173. PHMSA proposes to revise various definitions to better harmonize with 2018 SSR-6, Rev. 1. The proposed changes are as follows:

- Add “dose rate” as a new definition.
- Revise the definition of “Special form Class 7 (radioactive) material” to align with SSR-6, paragraph 823.

- Revise the definition of “Low Specific Activity (LSA) material” to remove the leaching prevention requirement for LSA-III materials.
- Revise the definition of “Surface Contaminated Object (SCO)” to include the SCO-III material introduced in this NPRM.

The details of these proposed changes are explained below.

Dose rate: A new definition of “dose rate” is being added to clarify the term as it is used in the HMR. In past alignment with the IAEA, “dose rate” has been used throughout the HMR as a term that was meant to be synonymous with “radiation level”—and until recently, the two terms have been used interchangeably. However, the IAEA has decided to exclusively use the term “dose rate” specified in 2018 SSR-6, Rev. 1. PHMSA and NRC have decided not to harmonize with that change because it would not result in a change in practice or safety but recognize that the use of two terms interchangeably without defining “dose rate” can be confusing to some readers. Therefore, to avoid confusion and provide greater clarity, PHMSA proposes to add a definition for “dose rate” that will reference the definition of “radiation level.”

Special form Class 7 (radioactive) material: PHMSA proposes to revise the definition of “Special form Class 7 (radioactive) material” to align with changes adopted by the IAEA.

Specifically, paragraph 823 of the 2018 SSR-6, Rev. 1:

- Prohibits continued use of special form radioactive material approved under the 1973 IAEA regulations, incorporated into the HMR in 1983.
- Prohibits new manufacture of special form radioactive material that received approval under the 1985 IAEA regulations, incorporated into the HMR in 1996.
- After December 31, 2025, the 2018 SSR-6, Rev. 1 prohibits new manufacture of special form radioactive material sources to a design that had received approval under the 1996 edition of the IAEA regulations, incorporated into the HMR in 2004.

Under this proposal, manufacturers of designs that conform to the requirements of the HMR—that were effective between April 1, 1996, and the effective date of any final rule—may

continue to use those designs provided they maintain a management system as required by SSR-6 (Rev. 1) paragraph 306. Manufacturers of older designs may be able to obtain new competent authority approvals for these designs because there have been no significant changes to the special form requirements since the IAEA 1985 regulations. For special forms approved under the pre-1985 IAEA requirements, no new manufacture has been authorized under the HMR since April 1, 1997, and those special form sources would all lack a quality assurance program that meets § 173.476(c)(4) requirements.

This proposed revision to the definition of “Special form Class 7 (radioactive) material” would phase out the oldest special form Class 7 (radioactive) material designs that do not meet current design requirements; however, it would continue to allow more recent designs to remain, provided a management system is maintained. This approach will increase safety by: (1) removing the oldest special form Class 7 (radioactive) materials from circulation that are at a minimum 24 years old; and (2) adding additional safety requirements to certain designs that remain in use. The following table provides a summary of these proposed changes:

| Year of Design (IAEA) | Year adopted by DOT | Can I continue to manufacture to this design year? | Can I continue to use this design? |
|------------------------------|----------------------------|---|---|
| 1973 | 1983 | No | No |
| 1985 | 1996 | No | Yes |
| 1996 | 2004 | Yes, through December 31, 2025 | Yes |

Low Specific Activity (LSA) material: PHMSA proposes to amend the definition of LSA material by removing the leaching prevention requirement for LSA-III materials and removing the reference to § 173.468. LSA is material with limited specific activity that is not fissile material or excepted under § 173.453. Specifically, LSA-III is solid material—excluding powders—with an average specific activity that does not exceed $2 \times 10^{-3} \text{ A}_2/\text{g}$, excluding any shielding material. Currently, LSA-III materials must also pass a leaching test, and the contamination must be uniformly distributed. When establishing the low average specific activity limits for LSA material in the transport regulations, IAEA based its analysis on the small

likelihood that, under normal conditions of transportation, a sufficient mass of such material could be taken into the body and result in a significant radiation hazard. For the 2018 SSR-6, IAEA's working group evaluated¹⁰ the need for the leaching test used to demonstrate that the leaching prevention requirement is met, as it had no apparent relevance to the inhalation risk of exposure to material during transportation and determined that the leaching test for LSA-III material did not contribute to IAEA's 50 mSv effective dose transport safety limit. PHMSA agrees with IAEA's findings that the leaching test does not enhance safety and proposes to harmonize with the 2018 SSR-6, Rev. 1 by removing the leaching prevention requirement from this section.

Surface Contaminated Object (SCO) III: PHMSA proposes to add a new section to the definition for "Surface Contaminated Objects" to create a type called "Surface Contaminated Object-III." This new form of surface contaminated object is meant for large solid objects (e.g., a steam generator, reactor coolant pump, pressurizer, or reactor head component, etc.) that cannot be transported in a package. Currently, such shipments require the application for—and granting of—a DOT special permit.¹¹ This proposed change would codify the requirements for the transportation of these shipments and remove the need for a special permit, replacing it with an approval which take less time and require less effort from the requestor due to the codified requirements. This approach allows for a more efficient transportation environment without any decrease in safety as PHMSA will retain the ability to reject applications that it deems unsafe.

SECTION 173.410

Section 173.410 prescribes general design requirements for packages used for the transportation of Class 7 (radioactive) materials. In this NPRM, PHMSA proposes two separate

¹⁰ A summary of the working group's conclusions is included in the rulemaking docket.

¹¹ PHMSA worked with our Canadian partners to redo a 2007 proposal for the adoption of SCO-III material into the IAEA regulations. Further, PHMSA used the experience and information we gained from developing the special permits and—along with our Canadian partners—developed a new proposal for SCO-III materials. That proposal was submitted to the IAEA by Canada and ultimately accepted.

changes to this section.

Paragraph (i) prescribes requirements for air transport only. PHMSA proposes to revise paragraph (i)(3) to require that all packages for transport by air must be able to withstand an internal pressure that produces a pressure differential of not less than the maximum normal operating pressure plus 95 kPa (13.8 psi). Because the HMR currently limits the provision in paragraph (i)(3) to liquid materials, this change would expand the requirement to all radioactive materials. This proposed change would not only harmonize the HMR with both the International Civil Aviation Organization Technical Instructions (ICAO TI) and IAEA regulations, but it would also increase safety by ensuring that all packages containing radioactive material shipped by air are capable of withstanding the pressure changes inherent in air transport. This provision has been implemented by ICAO for all international air carriers, and therefore PHMSA believes it is widely adopted already. However, we request comment on this assumption.

PHMSA acknowledges that NRC has chosen not to harmonize with the 2018 SSR-6, Rev. 1, and the ICAO TI by omitting the requirements of § 173.410(i)(3) from its proposed rulemaking. NRC believes that the existing reduced external pressure test value—which requires packages to be tested to an external pressure of 25 kPa (3.5 LbF/in²)¹² absolute—addresses air transport conditions and that Type AF and Type B packages are adequately robust compared to Type A packages. PHMSA requests comments on whether this disparity—between the PHMSA NPRM and the NRC NPRM—will have any negative effects on stakeholders.

Additionally, PHMSA proposes to add a new paragraph (j) that will require package manufacturers to take the effects of aging into consideration during the design process. The proposed new paragraph (j) will require the package designer to evaluate the potential degradation phenomena over time, such as corrosion, abrasion, fatigue, crack propagation, changes of material compositions or mechanical properties due to thermal loadings or radiation, generation of decomposition gas, and their impact on the functions important to safety. While

¹² LbF is a unit of measurement and means “Pounds Force.”

PHMSA believes package engineers already take these factors into consideration when they design radioactive packages, there is no specific requirement related to the aging of packaging designs. The codification of this best practice would ensure that radioactive packaging designs remain safe into the future, while also harmonizing the HMR with the IAEA standards to facilitate uniform international packaging standards and, therefore, international commerce.

Section 173.415

Section 173.415 lists the Type A packages that are authorized for shipment, provided that the packages do not contain quantities exceeding the A_1 or A_2 values for radionuclides in § 173.435. Paragraph (a) specifies the DOT Specification 7A Type A recordkeeping requirements, and PHMSA proposes to revise three subparagraphs in paragraph (a) to better clarify them.

First, PHMSA proposes to revise § 173.415(a)(1) to better clarify “a description of the package.” PHMSA proposes to add language requiring that the report detail the radionuclide(s) tested for use in the package, the radionuclide(s) chemical state (i.e., solid, liquid, or gas), and an indication as to whether the material is special form. This proposed change would increase safety by ensuring packages are tested for the materials they contain.

Second, PHMSA proposes to add language in § 173.415(a)(1)(i) to require test reports to describe how the test conditions met the requirements of § 173.461(a)(1). Section 173.461 describes the methods that can be used to demonstrate compliance with the tests required for Type A packages in § 173.465. Specifically, paragraph (a)(1) allows testing to be done with prototypes or samples of specimens representing LSA-III special form Class 7 (radioactive) material or packaging, in which case the contents of the packaging for the test must simulate as closely as practicable the expected range of physical properties of the radioactive contents or packaging to be tested. It also encourages testers to use non-radioactive materials when testing. Due to this flexibility, PHMSA proposes a requirement for testers to describe specifically how

the test was carried out so that it can easily be determined if the package in question is acceptable for its intended contents. This increased transparency in the testing process will have a positive effect on safety by allowing investigators to better understand the testing that took place and determine if it was performed correctly. Furthermore, PHMSA also proposes to add a reference to § 173.412(j) in § 173.415(a)(1)(i) to further clarify that the records maintained must show compliance with § 173.412(j). These proposed changes will provide greater clarity by removing the need for package manufacturers to interpret a “detailed description.”

Third, PHMSA proposes to revise § 173.415(a)(2) to allow offerors who obtained packagings from a packaging manufacturer—and were provided with a certification for those packagings—the option to contact the packaging manufacturer and have the packaging manufacturer send the documents required in paragraph (a)(1) to DOT, rather than requiring the offeror to maintain the documents required by paragraph (a)(1) on file. This proposed change would conform to PHMSA’s stated intent in the 2014 final rule.¹³ Additionally, PHMSA proposes to revise the language in paragraph (a)(2) to require certification that the packaging meets all the requirements of §§ 173.403, 173.410, 173.412, 173.465, and, if applicable, § 173.466, instead of § 178.350. Section 178.350 requires packagings to meet the requirements of those listed sections. These proposed changes will clarify the specific requirements that PHMSA expects packaging manufacturers certify their packagings to.

SECTION 173.417

Section 173.417 provides a list of authorized fissile materials packages. PHMSA proposes to add a new subparagraph (a)(2)(ii) for the import and export of fissile material packages that meet the requirements of paragraph 674 of SSR-6, and to reorganize paragraph (a) to more clearly outline when the various packagings are allowed. Paragraph 674 provides criteria by which fissile material may be transported using a package design that does not require

¹³ 79 FR 40589 (July 11, 2014).

certification by a competent authority to contain fissile material. Rather, if the mass of fissile nuclides is limited to the quantities specified in paragraph 674 and the package meets the performance criteria noted in paragraph 674(a)–(c), then the package would be safe for transport subject to criticality safety index accumulation control. PHMSA proposes to add language to highlight and clarify the acceptable use of this IAEA exception by listing it in the authorized fissile material packages section. This change will align PHMSA with the IAEA standards and provide a way for packages that meet these criteria to be shipped to and from the US.

SECTION 173.420

Section 173.420 prescribes requirements for transportation of uranium hexafluoride (fissile, fissile-excepted, and non-fissile). PHMSA proposes to add a new paragraph (f) to direct offerors who are shipping more than 0.1 kg of non-fissile or fissile-excepted uranium hexafluoride to § 173.477. This proposed change would aid offerors in finding the specific requirements for their materials in the HMR, thus increasing compliance and safety. Separately, PHMSA proposes to provide an additional reader's aid by adding an incorporation by reference notation to ANSI N14.1 in this section. PHMSA has also proposed to update the ANSI N14.1 standards incorporated by reference in section 171.7. For further information see SECTION 171.7 above.

SECTION 173.424

Section 173.424 provides an exception from specification packaging, labeling, marking (except for the UN identification number marking requirement described in § 173.422(a)), and—if not a hazardous substance or hazardous waste—shipping papers, and the requirements of subpart I (Class 7 (Radioactive) Materials) provided all the conditions in the section are met. PHMSA proposes to revise paragraph (h) of this section to make it consistent with a change

made to § 173.421 in a previous final rule.¹⁴ This proposed change would revise the section reference from § 173.426 to § 173.453 and remove the exception for shipments of up to 15 grams of uranium-235. The revised paragraph would allow for any of the exceptions provided in § 173.453—including two new ones proposed in this NPRM—to be utilized when shipping fissile material as excepted packages. While these exceptions are more stringent than the flat limit of 15 grams of uranium-235, they allow for multiple volumes from 1 to 180 grams of fissile material—not only uranium-235—to utilize the excepted packages provisions in this section.

SECTION 173.427

Section 173.427 provides transport requirements for LSA and SCO materials. Currently, offerors must obtain a special permit to ship materials that meet the new definition of SCO-III. PHMSA proposes to revise this section to add the limits for the newly created SCO-III material. This proposed change would revise the HMR to clearly state the requirements for shipping SCO-III materials without the need for a company to obtain a special permit. Instead, a company will apply for a less burdensome approval. This process will still require PHMSA to review the requestor's transport plan to ensure it is safe and within the requirements of the HMR, thus maintaining the level of safety achieved by the current system. This proposed change would also align the HMR with IAEA requirements.

In order to revise the HMR as described above, PHMSA proposes to redesignate current paragraph (d) as paragraph (e), redesignate current paragraph (e) as paragraph (f), and create a new paragraph (d) that will list the requirements for the transport of SCO-III material. PHMSA also proposes to require approval by the Associate Administrator of Hazardous Materials Safety for SCO-III shipments; therefore, paragraph (d)(6) would prescribe the approval application requirements for SCO-III shipments. In addition, PHMSA proposes to amend paragraphs (a)(2) and (a)(6)(i) to provide exceptions for SCO-III material that cannot meet the transport

¹⁴ 70 FR 56083 (Sept. 23, 2005).

requirements outlined in these provisions because of its large physical size, provided certain provisions are included in the shipment's transport plan.

SECTION 173.431

Section 173.431 contains the activity limits for Type A and Type B packages. In this NPRM, PHMSA proposes to revise paragraph (b) by removing references to §§ 173.416, 173.417, and 173.472. First, PHMSA proposes to remove § 173.472 in this NPRM as an editorial edit following deletion in the HM-250 final rule—therefore the reference to § 173.472 is no longer applicable.¹⁵ *See* SECTION 173.472 of the Section-by-Section Review for further details. Second, PHMSA proposes to remove reference to §§ 173.416 and 173.417 as they are no longer relevant to the activity limits for Type B packages after the various DOT Type B packages were previously phased out. The phaseout began in 2004 with the publication of the HM-230 final rule¹⁶ and was completed by October 1, 2008.

SECTION 173.433

Section 173.433 prescribes requirements for determining basic radionuclide values and for listing radionuclides on shipping papers and labels. PHMSA proposes to add a new paragraph (i) that would allow stakeholders to request an approval to allow certain instruments or articles to have an alternative activity limit for what is considered an exempt material instead of those found in the table in § 173.436. Alternative exemption limits of material contained within instruments or articles may be justified when it is shown that the construction and design of the item itself provides containment and shielding of the radionuclide—in both routine and adverse conditions of transport—to minimize risks. An alternative activity limit would allow for Class 7 materials transported as component parts of an instrument or article to be shipped as an exempt

¹⁵ 79 FR 40589 (July 11, 2014).

¹⁶ 69 FR 3631 (Jan. 26, 2004).

material provided both PHMSA and—for international shipments—other competent authorities approve. Currently, this practice is permissible only via special permit. However, the 2018 SSR-6, Rev. 1 codified language to allow a shipper who transports Class 7 (radioactive) material internationally to request this exemption. The IAEA requires multilateral approval for an alternative activity limit shipment meaning an offeror must obtain a competent authority approval from the design or shipment origin country as well as any country the shipment will be transported through or into. PHMSA believes alignment of the HMR with the 2018 SSR-6, Rev. 1 would facilitate international trade and—in fact—U.S. companies may be at a domestic disadvantage if PHMSA were to not adopt this change into the HMR.

SECTION 173.435

Section 173.435 lists the A_1 and A_2 values for the most commonly transported radionuclides in the “Table of A_1 and A_2 values for radionuclides.” A_1 and A_2 values are used in the international and domestic transportation regulations to specify the amount of radioactive material that is permitted to be transported in a particular packaging.

PHMSA proposes to revise the table by adding seven new radionuclides—Ba-135m, Ge-69, Ir-193m, Ni-57, Sr-83, Tb-149, and Tb-161)—that the NRC has indicated there is an increased need to ship (e.g., Ba-135m and Ge-69 for medical uses, etc.). Without provided values for these radionuclides, the general values given in tables 7 and 8 must be used, which could significantly impact the ability to transport these radionuclides by either necessitating decay prior to shipment, the use of multiple Type A Packages, or the use of Type B packages, as well as leading to possible miscommunication of the relative hazards. PHMSA has determined these new activity limits are safe for transportation in specification Type A packaging. This proposed change would provide a cost savings to offerors of these newly added radionuclides without a reduction in safety. Adding these seven new radionuclides will also provide increased clarity about the products shipped, which will increase safe transport and shipment of these

radionuclides.

PHMSA also proposes to make an editorial change to the specific activity values for Rb(nat). Currently, the specific activity values of 6.7×10^{-10} TBq/g and 1.8×10^{-8} Ci/g incorrectly use an underscore to represent the negative sign. In this NPRM, we are proposing to revise the specific activity values to correctly show the appropriate negative sign.

SECTION 173.436

Section 173.436 specifies the nuclide-specific exemption concentrations and the nuclide-specific exemption-consignment activity limits for radionuclides. As noted above, in order to align with the 2018 SSR-6, Rev. 1, PHMSA proposes to add seven new radionuclides to this table (Ba-135m, Ge-69, Ir-193m, Ni-57, Sr-83, Tb-149, and Tb-161). Without provided values for these radionuclides, the general values given in table 8 must be used, which could significantly impact the ability to transport these radionuclides by either necessitating decay prior to shipment, the use of multiple Type A Packages, or the use of Type B packages.

Additionally, PHMSA proposes to clarify footnote “b” of § 173.436 per table 2 to state that in the case of Th-natural, the parent nuclide is Th-232; and in the case of U-natural, the parent nuclide is U-238. This information is not clearly communicated in the footnote as currently written and may cause frustration in the interpretation of the HMR.

SECTION 173.443

Section 173.443 specifies contamination control limits. PHMSA proposes to revise paragraph (c) to reference the new paragraph (d) proposed in § 173.427. This change would amend the requirement for each conveyance, overpack, freight container, tank, or intermediate bulk container—used for transporting Class 7 (radioactive) materials as an exclusive use shipment—to be surveyed with appropriate radiation detection instruments after each exclusive use transport to include the new SCO-III materials. By adding the reference to § 173.427(d),

PHMSA is applying the existing contamination control requirements to the new SCO-III materials. This proposed change would ensure that any conveyance used to transport SCO-III material is properly surveyed and decontaminated before returning to general service, and would harmonize with the IAEA standards, thus ensuring conveyances may easily continue on in international service safely.

SECTION 173.447

Section 173.447 specifies the general requirements for temporary storage of Class 7 (radioactive) material during the course of transportation. In 2002—in the HM-230 NPRM¹⁷—the Research and Special Programs Administration (RSPA), PHMSA’s precursor agency, proposed to move certain requirements in § 173.447 to § 173.441(d)(3). These requirements included a limit of 50 on the sum of transport indexes of groups of packages while in storage incidental to transportation, and distancing requirements of at least 6 meters or 20 feet. The paragraph enacting those changes was inadvertently omitted in the HM-230 final rule.¹⁸ These values have been in place in the IAEA and other sections of the HMR for over 30 years. Therefore, PHMSA proposes to reinstate the limit on the sum of transport indexes of a group of packages and distancing requirements while in storage incidental to transport as paragraph (b) in § 173.447.

The proposed requirements are consistent with the various modal sections of the HMR. For example, parts 174 and 177 for railroad and highway transportation, respectively, both require that shippers keep any single group of Class 7 (radioactive) packages in any storage location limited to a total transport index number of 50. Similarly, the requirements for air transportation in § 175.700 and vessel transportation in § 176.704 limit the transportation index to 50 on passenger aircraft or in freight containers. Additionally, all modes of transportation

¹⁷ 67 FR 21327 (Apr. 30, 2002).

¹⁸ 69 FR 3631 (Jan. 26, 2004).

require Class 7 (radioactive) materials to maintain a certain distance from animals, people, or other Class 7 (radioactive) materials. For example, part 177 requires the proposed distance requirements of 6 meters or 20 feet between groups of packages. These proposed requirements in § 173.447 for total transport index and distancing would help to ensure the safety of those who store and handle Class 7 (radioactive) materials.

SECTION 173.448

Section 173.448 contains general transportation requirements for Class 7 (radioactive) materials. PHMSA proposes to revise this section to require overpacks to have the consignor and/or consignee marked on the outside of the overpack if it cannot be seen on the packages. This proposed change would reduce confusion and increase safety by identifying the consignee and consignor marking requirements on the outside of the overpack if they cannot be seen on the individual packages in the overpack.

SECTION 173.453

Section 173.453 contains provisions that allow a material to be excepted from some requirements for fissile materials. PHMSA proposes to add a sentence to paragraph (d) that would require materials utilizing that exception to have fissile material that is distributed homogeneously and that does not form a lattice arrangement. Uranium enriched to less than five percent (5%) by weight is most reactive when it is in a heterogeneous configuration. For uranium enriched to not more than one percent (1%), a large heterogeneous system or lattice arrangement would be required for a material utilizing this exception to approach criticality. This proposed change would align the HMR with the current NRC and IAEA requirements and ensure the safe transport of such fissile material.

Additionally, PHMSA proposes to add a new paragraph (g) that would provide a new exception for up to 3.5 grams of uranium-235 where the uranium-235 is not more than five

percent (5%) of the material. This new exception is comparable to the 49 CFR 173.453(a) exemption limit of up to 2.0 grams of fissile material per package. The additional neutron absorption provided by uranium-238 in 5.0 weight percent enriched uranium compensates for the additional 1.5 grams of uranium-235 mass (i.e., up to 3.5 grams uranium-235 per package), when compared to the 49 CFR 173.453(a) limit of 2.0 grams. This proposed change would align the HMR with the changes that NRC has identified in the Regulatory Basis for NRC Docket 2016-0179. It would also align the HMR with the IAEA standards—but without the consignment limit in SSR-6 paragraph 570(c)—and allow the increased transport of uranium-235 without any additional impacts on safety. PHMSA has decided not to adopt the consignment limit. The amount of fissile material allowed by this proposed provision would be similar to the existing exception in 49 CFR 173.453(a) in terms of reactivity. In addition, the consignment limit of SSR-6 paragraph 570(c) does not affect the accumulation of packages on a transport conveyance because there is no limit to the number of consignments that may be present on a single conveyance.

Finally, PHMSA proposes to add a new paragraph (h) that will provide an exception for up to 140 grams of fissile nuclides when shipped under exclusive use. This proposed change would align the HMR with the changes that NRC has identified in the Regulatory Basis for NRC Docket 2016-0179, by adopting a modified version of a 45-gram exception in SSR-6. In evaluating this new exception, NRC staff determined that the IAEA SSR-6 45-gram exception was unnecessarily conservative—45 grams represents about one eighth of the consensus minimum subcritical mass value for plutonium-239 moderated by water. NRC staff also determined that a mass value higher than that contained in IAEA SSR-6 paragraph 417(e) is justified, given the conservatism inherent in the exclusive use restriction of the SSR-6 provision, and because plutonium-239 would have to be shipped in a Type B package that withstands hypothetical accident conditions. Therefore, PHMSA and NRC propose a limit of 140 grams of fissile material. When determining the proposed limit, NRC considered uranium-235 rather than

plutonium-239, as any amount of plutonium-239 over 0.435 grams is considered Type B, which would have to be packaged to withstand both normal and hypothetical accident conditions of transport. This limit is based on one-fifth of a consensus minimum critical mass of uranium-235 under optimum conditions. This mass represents a conservative limit for fissile material, because five times this amount would remain subcritical under any conditions. PHMSA and NRC anticipate that shipments utilizing this exception would be used primarily for domestic transportation (e.g., decommissioning activities where contaminated items or small quantities of fissile material would be shipped for disposal), and only rarely for international shipments. In the rare instances where international shipments under this exemption provision are necessary, shippers would have to be aware of this difference and ship under the lower limit in IAEA SSR-6 paragraph 417(e).

SECTION 173.465

Section 173.465 contains the test requirements for Type A packaging. Specifically, paragraph (c) contains the free drop test requirements. In response to a request from the U.S. Department of Energy (DOE), PHMSA proposes to revise paragraph (c) to clarify that the free drop test required by paragraph (c)(2) is applicable only to fissile material rectangular packages not exceeding 50 kg and fissile material cylindrical packages not exceeding 100 kg. This proposed change would align the HMR with the similar NRC requirement in 10 CFR 71.71(c)(8), which was modified in a previous final rule.¹⁹ NRC agreed with a comment to that rule that for a large and heavy package, it is considered highly implausible for a package to undergo a one-foot corner drop as a normal condition of transport, and that only a free drop with the package in its normal orientation should be specified as a normal condition of transport for large and heavy packages. NRC removed the corner drop test for fiberboard, wood, or fissile material rectangular packages weighing more than 50 kg (110 lbs.), and for fissile material

¹⁹ 60 FR 50248 (Sep. 28, 1995).

cylindrical packages weighing more than 100 kg (220 lbs.). PHMSA agrees with NRC's determination and expects that the proposed change will provide cost savings to packaging manufacturers without reducing safety.

SECTION 173.468

Section 173.468 contains the requirements for the leaching test required for LSA-III materials in § 173.403. As stated in the Section-by-Section discussion for § 173.403, PHMSA proposes to remove the leaching test requirement. Therefore, PHMSA proposes to remove and reserve § 173.468 in its entirety as it would no longer be necessary.

SECTION 173.472

Section 173.472 provides the requirements for exporting DOT specification Type B packages. This section is no longer necessary because the HM-250 final rule²⁰ amended §§ 173.416 and 173.417 to remove the paragraphs that authorized use of DOT specification Type B and fissile material packages. Therefore, PHMSA proposes to remove and reserve this section in its entirety.

SECTION 173.475

Section 173.475 contains the general quality control requirements for packages authorized to contain Class 7 (radioactive) materials. In this section, PHMSA proposes to add a new paragraph (j) that would require offerors and shippers to assure that packages or overpacks have been properly maintained while in storage before using those packages to transport Class 7 (radioactive) materials. This new paragraph would require that packages are maintained properly while in storage, thus increasing safety by reducing the likelihood that a package would fail

²⁰ 79 FR 40589 (Jul. 11, 2014).

while in transportation. PHMSA expects that there will be safety benefits to packages that are properly maintained in storage. This proposed change would align with the 2018 SSR-6, Rev. 1.

D. Part 174

SECTION 174.750

Section 174.750 contains the requirements for rail incidents that involve a hazardous materials leak. PHMSA proposes to revise paragraph (a) to reference § 173.443(e) when a leak of Class 7 (radioactive) materials occurs. Section 173.443(e) specifies the steps that must be taken when a leak of Class 7 (radioactive) materials occurs. These steps include limiting access to the package or conveyance, determining the resultant radiation level of the package or conveyance, and—if applicable—additional steps for the protection of persons, property, and the environment. This proposed change would provide clarification and ensure that the contamination control requirements for Class 7 materials are more easily accessible to rail carriers.

E. Part 175

SECTION 175.705

Section 175.705 contains the requirements for air carriers in the event of radioactive contamination. PHMSA proposes to revise paragraph (b) to reference § 173.443(e) when a leak occurs of Class 7 (radioactive) materials. Section 173.443(e) specifies the steps that must be taken when a leak of Class 7 (radioactive) materials occurs. These steps include limiting access to the package or conveyance, determining the resultant radiation level of the package or conveyance, and—if applicable—additional steps for the protection of persons, property, and the environment. This proposed change would provide clarification and ensure that the contamination control requirements for Class 7 materials are more easily accessible to air carriers.

F. Part 176

SECTION 176.715

Section 176.715 contains the requirements for contamination control aboard vessels. PHMSA proposes to revise § 176.715 to reference § 173.443(e) when a leak occurs of Class 7 (radioactive) materials. Section 173.443(e) specifies the steps that must be taken when a leak of Class 7 materials occurs. These steps include limiting access to the package or conveyance, determining the resultant radiation level of the package or conveyance, and—if applicable—additional steps for the protection of persons, property, and the environment. This proposed change would provide clarification and ensure that the contamination control requirements for Class 7 materials are more easily accessible to vessel carriers.

G. Part 177

SECTION 177.843

Section 177.843 contains requirements in the event of a motor vehicle becoming contaminated. PHMSA proposes to revise paragraph (c) to reference § 173.443(e) when a leak occurs of Class 7 (radioactive) materials. Section 173.443 (e) specifies the steps that must be taken when a leak of Class 7 materials occurs. These steps include limiting access to the package or conveyance, determining the resultant radiation level of the package or conveyance, and—if applicable—additional steps for the protection of persons, property, and the environment. This proposed change would provide clarification and ensure that the contamination control requirements for Class 7 materials are more easily accessible to motor vehicle carriers.

VI. Regulatory Analyses and Notices

A. Statutory/Legal Authority

This NPRM is published under the authority of Federal Hazardous Materials

Transportation Act (HMTA; 49 U.S.C. 5101-5127). Section 5103(b) of the HMTA authorizes the Secretary of Transportation to prescribe regulations for the safe transportation of hazardous materials in intrastate, interstate, and foreign commerce. The Secretary's section 5103(b) authority includes the authority to prescribe regulations to provide for security in such transportation. Additionally, 49 U.S.C. 5120 authorizes the Secretary to consult with interested international authorities to ensure that, to the extent practicable, regulations governing the transportation of hazardous materials in commerce are consistent with the standards adopted by international authorities. The Secretary has delegated the authority granted in the HMTA to the PHMSA Administrator pursuant to 49 CFR 1.97(b).

B. Executive Order 12866 and DOT Regulatory Policies and Procedures

Executive Order 12866 ("Regulatory Planning and Review")²¹ requires agencies to regulate in the "most cost-effective manner," to make a "reasoned determination that the benefits of the intended regulation justify its costs," and to develop regulations that "impose the least burden on society." Similarly, DOT Order 2100.6A ("Policies and Procedures for Rulemakings") requires that PHMSA rulemaking actions include "an assessment of the potential benefits, costs, and other important impacts of the regulatory action," and (to the extent practicable) the benefits, costs, and any significant distributional impacts, including any environmental impacts.

Executive Order 12866 and DOT Order 2100.6A require that PHMSA submit "significant regulatory actions" to the Office of Management and Budget (OMB) for review. This rulemaking is not considered a significant regulatory action under section 3(f) of Executive Order 12866 and, therefore, was not formally reviewed by OMB. This rulemaking is also not considered a significant rule under DOT Order 2100.6A.

The following is a brief summary of costs, savings, and net benefits of some of the amendments proposed in this notice. PHMSA has developed a more detailed analysis of these

²¹ 58 FR 51735 (Oct. 4, 1993).

costs and benefits in the preliminary regulatory impact analysis (PRIA), a copy of which has been placed in the docket.²² PHMSA seeks public comment on its proposed revisions to the HMR and the preliminary cost and benefit analyses in the PRIA.

PHMSA proposes to amend the HMR to maintain alignment with international regulations and standards and to make regulatory amendments identified through internal regulatory review processes to update, clarify, correct, or streamline certain regulatory requirements applicable to the transportation of Class 7 (radioactive) materials. These amendments would maintain the continued high level of safety in the transportation of hazardous materials while producing a net cost savings.

PHMSA quantifies \$57,000²³ in net cost savings over a 10-year period from the incorporation of approximately 50²⁴ existing special permits through the proposed amendments to add SCO-III material and to allow stakeholders to request an approval to allow certain instruments or articles to have an alternative activity limit for what is considered an exempt material. Under the proposal, these special permits would no longer be needed for shippers and transporters of radioactive materials to comply with the HMR, eliminating the burden of renewal. The following estimates do not include the non-monetized and qualitative cost/cost savings discussed in the PRIA. The following Table 6.1 from the PRIA presents a summary of monetized impacts that contribute to PHMSA's estimation of quantified net cost savings.

Table 6.1 Proposed Special Permit Cost Savings

| Total Cost Savings in 2021 Dollars over 10 years at 3% and 7% Discount Rates. | | | |
|---|---------------------------|-----------------------------|------------------------------|
| Year | Undiscounted Cost Savings | Discounted Cost Saving (3%) | Discounted Cost Savings (7%) |
| 2023 | \$6,886.1 | \$6,490.8 | \$6,014.6 |
| 2024 | \$6,886.1 | \$6,301.7 | \$5,621.1 |
| 2025 | \$6,886.1 | \$6,118.2 | \$5,253.3 |

²² The PRIA is available in the regulatory docket (Docket ID: PHMSA-2018-0081) at www.regulations.gov.

²³ The total cost savings is calculated using 2016 dollars.

²⁴ This number is based on an estimation by subject matter experts from the Office of Hazardous Materials Safety.

| | | | |
|------------|------------|------------|------------|
| 2026 | \$6,886.1 | \$5,940.0 | \$4,490.7 |
| 2027 | \$6,886.1 | \$5,767.0 | \$4,588.5 |
| 2028 | \$6,886.1 | \$5,599.0 | \$4,288.3 |
| 2029 | \$6,886.1 | \$5,435.9 | \$4,007.8 |
| 2030 | \$6,886.1 | \$5,277.6 | \$3,745.6 |
| 2031 | \$6,886.1 | \$5,123.9 | \$3,500.5 |
| 2032 | \$6,886.1 | \$4,974.6 | \$3,271.5 |
| Total | \$68,860.7 | \$57,028.7 | \$45,200.8 |
| Annualized | | \$6,685.5 | \$6,435.6 |

PHMSA describes additional provisions in the PRIA for which PHMSA was unable to monetize their cost savings impacts, but instead provides a qualitative discussion. Additional potential benefits identified in this NPRM include enhanced safety resulting from the consistency of domestic and international requirements for transportation of radioactive materials and streamlining regulatory compliance for shippers engaged in domestic and international commerce, including trans-border shipments within North America. In addition, the proposed changes should permit continued access to foreign markets by domestic shippers of radiopharmaceuticals and other radioactive materials. While information gaps prevent quantification of cost savings for these items, PHMSA believes that they streamline unnecessary requirements or provide additional flexibility, while maintaining the same high level of safety in the transportation of hazardous materials.

As noted in Table 6.1, PHMSA estimates annualized net cost savings of approximately \$6,700 at a 3% discount rate. Please see the PRIA in the regulatory docket for additional detail and a description of PHMSA's methods and calculations. PHMSA encourages interested parties to provide information and quantitative data relevant to the proposals in this notice and the associated costs and benefits described in the preliminary regulatory evaluation for this rulemaking.

C. Executive Order 13132

PHMSA analyzed this rulemaking in accordance with the principles and criteria

contained in Executive Order 13132 (“Federalism”)²⁵ and its implementing Presidential Memorandum (“Preemption”).²⁶ Executive Order 13132 requires agencies to assure meaningful and timely input by state and local officials in the development of regulatory policies that may have “substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.”

The proposed rule would not have substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. The Federal hazardous materials transportation law contains an express preemption provision at 49 U.S.C. 5125(a) that preempts State, local, and Tribal requirements if: (1) compliance with such requirement makes compliance with the DOT regulations issued under the authority of the Federal hazardous materials transportation law not possible; or (2) compliance with such requirement is an obstacle to carrying out a regulation prescribed under the authority of the Federal hazardous materials transportation law. The Federal hazardous materials transportation law also contains an express preemption provision at 49 U.S.C. 5125(b) that preempts State, local, and Tribal requirements on certain covered subjects, unless the non-Federal requirements are “substantively the same” as the Federal requirements, including the following:

- (1) The designation, description, and classification of hazardous material;
- (2) The packing, repacking, handling, labeling, marking, and placarding of hazardous material;
- (3) The preparation, execution, and use of shipping documents related to hazardous material and requirements related to the number, contents, and placement of those documents;
- (4) The written notification, recording, and reporting of the unintentional release in

²⁵ 64 FR 43255 (Aug. 4, 1999).

²⁶ 74 FR 24693 (May 22, 2009).

transportation of hazardous material; and

(5) The design, manufacture, fabrication, inspection, marking, maintenance, recondition, repair, or testing of a packaging or container represented, marked, certified, or sold as qualified for use in transporting hazardous material in commerce.

This proposed rule addresses covered subject items (1), (2), (3), and (5) and would preempt any State, local, and Tribal requirements not meeting the “substantively the same” standard. Any preemption results directly from operation of 49 U.S.C. 5125. In addition, in this instance, the preemptive effect of the proposed rule is limited to the minimum level necessary to achieve the objectives of the hazardous materials transportation law under which the final rule is promulgated. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

D. Executive Order 13175

PHMSA analyzed this rulemaking in accordance with the principles and criteria contained in Executive Order 13175 (“Consultation and Coordination with Indian Tribal Governments”)²⁷ and DOT Order 5301.1 (“Department of Transportation Policies, Programs, and Procedures Affecting American Indians, Alaska Natives, and Tribes”).²⁸ Executive Order 13175 and DOT Order 5301.1 require DOT Operating Administrations to assure meaningful and timely input from Native American Tribal government representatives in the development of rules that significantly or uniquely affect Tribal communities by imposing “substantial direct compliance costs” or “substantial direct effects” on such communities or the relationship and distribution of power between the federal government and Native American Tribes.

PHMSA assessed the impact of the rulemaking and determined that it would not significantly or uniquely affect Tribal communities or Native American Tribal governments. The

²⁷ 65 FR 67249 (Nov. 9, 2000).

²⁸ Available at DOT Order 5301.1 American Indians/Alaska Natives/Tribes | US Department of Transportation.

changes to the HMR proposed in this NPRM would have broad, national scope. PHMSA does not expect this rulemaking would significantly or uniquely affect Tribal communities, impose substantial compliance costs on Native American Tribal governments, or mandate Tribal action. And because PHMSA expects the rulemaking would not adversely affect the safe transportation of hazardous materials generally, PHMSA does not expect it would entail disproportionately high adverse risks for Tribal communities. For these reasons, the funding and consultation requirements of Executive Order 13175 and DOT Order 5301.1 to apply. However, PHMSA solicits comment from Native American Tribal governments and communities on potential impacts of the proposed rulemaking.

E. Regulatory Flexibility Act and Executive Order 13272

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires agencies to review proposed regulations to assess their impact on small entities, unless the agency head certifies that a proposed rulemaking will not have a significant economic impact on a substantial number of small entities including small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations under 50,000. The Regulatory Flexibility Act directs agencies to consider exceptions and differing compliance standards for small businesses, where possible to do so and still meet the objectives of applicable regulatory statutes. Executive Order 13272 (“Proper Consideration of Small Entities in Agency Rulemaking”)²⁹ requires agencies to establish procedures and policies to promote compliance with the Regulatory Flexibility Act and to “thoroughly review draft rules to assess and take appropriate account of the potential impact” of the rules on small businesses, governmental jurisdictions, and small organizations. The DOT posts its implementing guidance on a dedicated webpage.³⁰

²⁹ 67 FR 53461 (Aug. 16, 2002).

³⁰ DOT, “Rulemaking Requirements Related to Small Entities,” <https://www.transportation.gov/regulations/rulemaking-requirements-concerning-small-entities> (last accessed June 17, 2021).

This proposed rulemaking has been developed in accordance with Executive Order 13272 and with DOT's procedures and policies to promote compliance with the Regulatory Flexibility Act to ensure that potential impacts of draft rules on small entities are properly considered. This proposed rule facilitates the transportation of hazardous materials in international commerce by providing consistency with international standards. It applies to offerors and carriers of hazardous materials, some of whom are small entities, such as suppliers, packaging manufacturers, distributors, and training companies. As discussed in the PRIA, the amendments in this proposed rule would result in net cost savings and streamline regulatory compliance for shippers engaged in domestic and international commerce, including transborder shipments within North America. PHMSA has identified six provisions proposed in the NPRM that may incur costs however as explained in the PRIA it does not believe these costs will be significant. Additionally, the proposals in this notice would allow U.S. companies, including small entities competing in foreign markets, to comply, to the maximum extent possible, with a single system of regulations. The proposals would also maintain the high level of safety in the transport of hazardous materials. Therefore, PHMSA tentatively certifies that these amendments will not, if adopted, have a significant economic impact on a substantial number of small entities. However, PHMSA solicits comments on the anticipated economic impacts to small entities and which entities will be affected.

F. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*), no person is required to respond to an information collection unless it has been approved by the Office of Management and Budget (OMB) and displays a valid OMB control number. Pursuant to 44 U.S.C. 3506(c)(2)(B) and 5 CFR 1320.8(d), PHMSA must provide interested members of the public and affected agencies with an opportunity to comment on information collection and recordkeeping requests.

PHMSA has analyzed this NPRM in accordance with the Paperwork Reduction Act. PHMSA currently accounts for shipping paper burdens under OMB Control Number 2137-0034, “Hazardous Materials Shipping Papers and Emergency Response Information.” PHMSA proposes two amendments in this NPRM that may impact burden accounted for in OMB Control Number 2137-0034. The first is the proposed revision to § 172.203(d) to allow a shipper to list the label type and transport index of an overpack on the shipping paper, instead of for the individual packages contained in the overpack. The second is the proposed requirement for a shipper to list the nuclide names for fissile Class 7 (radioactive) material on the shipping paper even if it is not required for the package in accordance with § 172.203. PHMSA expects the proposed change regarding an overpack’s transport index will result in an overall reduction in burden while the nuclides proposed change will result in a small increase in burden. PHMSA analyzed these proposals and expects the impact to the overall annual burden will be negligible in relation to the total number of burden hours currently associated with this information collection because PHMSA anticipates that the proposed change which will increase burden will affect less than 10 shipments per year. PHMSA seeks comment on any expected cost of the proposed change requiring a shipper to list nuclide names.

PHMSA accounts for burden associated with Class 7 (radioactive) materials reporting and recordkeeping requirements under OMB Control Number 2137-0510 “RAM Transportation Requirements.” PHMSA proposes to revise § 173.448 to require that overpacks be marked with the consigner and consignee name and address when the mark is not visible. PHMSA expects that this proposed revision will increase burden under OMB Control Number 2137-0510. PHMSA estimates that there are 10 respondents offering radioactive materials in overpacks. Each of these respondents will be required to mark the consigner and consignee name and address on 50 overpacks per year, for a total of 500 annual responses (10 respondents x 50 overpacks per respondent). PHMSA estimates that it will take one (1) minute to mark each overpack with the consigner and consignee name and address, resulting in an increase of

approximately eight (8) annual burden hours. The following summarizes the estimated increase in burden associated with OMB Control Number 2137-0510:

Annual Increase in Number of Respondents: 10

Annual Increase in Number of Responses: 500

Annual Increase in Burden Hours: Eight (8)

PHMSA requests comments on the information collection and recordkeeping burdens associated with developing, implementing, and maintaining these proposed requirements.

Address written comments to the DOT Docket Operations Office identified in the **ADDRESSES** section of this rulemaking. PHMSA must receive comments regarding information collection burdens prior to the close of the comment period identified in the **DATES** section of this rulemaking. Requests for a copy of this information collection should be directed to Steven Andrews, ohmspra@dot.gov, Standards and Rulemaking Division (PHH-10), Pipeline and Hazardous Materials Safety Administration, 1200 New Jersey Avenue SE, Washington, DC 20590-0001. If these proposed amendments are adopted in a final rule, PHMSA will submit the revised information collection and recordkeeping requirements to OMB for approval.

G. Unfunded Mandates Reform Act of 1995

The Unfunded Mandates Reform Act of 1995 (UMRA; 2 U.S.C. 1501 *et seq.*) requires agencies to assess the effects of federal regulatory actions on state, local, and Tribal governments, and the private sector. For any NPRM or final rule that includes a federal mandate that may result in the expenditure by state, local, and Tribal governments, or by the private sector of \$100 million or more in 1996 dollars in any given year, the agency must prepare, amongst other things, a written statement that qualitatively and quantitatively assesses the costs and benefits of the federal mandate.

As explained in the PRIA, available for review in the docket, this proposed rulemaking does not impose unfunded mandates under the UMRA. It does not result in costs of \$100 million

or more in 1996 dollars to either state, local, or Tribal governments, or to the private sector, in any one year. Therefore, the analytical requirements of UMRA do not apply.

H. Environmental Assessment

The National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*), requires that federal agencies analyze proposed actions to determine whether the action would have a significant impact on the human environment. The Council on Environmental Quality implementing regulations (40 CFR parts 1500-1508) require Federal agencies to conduct an environmental review considering (1) the need for the action, (2) alternatives to the action, (3) probable environmental impacts of the action and alternatives, and (4) the agencies and persons consulted during the consideration process. DOT Order 5610.1C (“Procedures for Considering Environmental Impacts”) establishes departmental procedures for evaluation of environmental impacts under NEPA and its implementing regulations.

1. Purpose and Need

This NPRM would amend the HMR to maintain alignment with international consensus standards by incorporating into the HMR various amendments from the International Atomic Energy Agency (IAEA) publication, entitled “Regulations for the Safe Transport of Radioactive Material, 2018 Edition, Specific Safety Requirements, No. SSR-6 (Rev. 1).” PHMSA proposes additional amendments that are intended to update, clarify, correct, or streamline certain regulatory requirements. PHMSA notes that the amendments proposed in this NPRM are intended to result in cost savings and reduced regulatory burden for shippers engaged in domestic and international commerce, including transborder shipments within North America. Absent adoption of the amendments proposed in the NPRM, U.S. companies—including numerous small entities competing in foreign markets—may be at an economic disadvantage because of their need to comply with a dual system of regulations.

As explained at greater length above in the preamble of this NPRM and in the PRIA (each of which are incorporated by reference in this discussion of the environmental impacts of the Proposed Action Alternative), PHMSA expects the adoption of the regulatory amendments proposed in this NPRM would maintain the high safety standard currently achieved under the HMR. PHMSA has evaluated the safety each of the amendments proposed in this NPRM on its own merit, as well as the aggregate impact on transportation safety from adoption of those amendments.

2. Alternatives

In developing this proposed rule, PHMSA considered the following alternatives:

NO ACTION ALTERNATIVE

If PHMSA were to select the No Action Alternative, current regulations would remain in place and no provisions would be amended or added.

PROPOSED ACTION ALTERNATIVE

This alternative is the current proposal as it appears in this NPRM, applying to transport of hazardous materials by various transport modes (highway, rail, vessel, and aircraft). The proposed amendments included in this alternative are more fully discussed in the preamble and regulatory text sections of this NPRM. This proposed action amends certain requirements related to the shipment of Class 7 (radioactive) materials including various provisions that will increase safety standards and improve enforceability such as:

- § 173.410 – PHMSA is proposing a new paragraph which will require each packages used for the shipment of Class 7 (radioactive) materials to be designed so that the effect of aging mechanisms (e.g., corrosion, abrasion, fatigue, crack propagation, changes of material compositions or mechanical properties due to thermal loadings or radiation, generation of decomposition gas, etc.) and their impact on the functions important to safety is considered.

- § 173.453(d) – PHMSA is proposing to add an additional requirement to this exception requiring fissile material to be distributed homogeneously and to not form a lattice arrangement within the package.

Furthermore, this NPRM proposes to amend the following provisions, which PHMSA will explain in greater detail the following section analyzing environmental impacts.

- § 173.403 – PHMSA is proposing to remove the requirement for compliance with § 173.468, which requires the material to be insoluble or be intrinsically contained in a way that prevents leaching when placed in water.
- § 173.427 – PHMSA is proposing to add a new category of materials, SCO-III that were previously authorized for transport by special permit.
- §§ 173.435 and 173.436 – PHMSA is proposing to add various radionuclides to the “Table of A₁ and A₂ values for radionuclides” and the “Exempt material activity concentrations and exempt consignment activity limits for radionuclides.”
- § 173.453 – PHMSA is proposing to add two entries, “uranium with enrichment up to five percent” and “fissile material with no more than 140 grams fissile nuclides” to the list of fissile materials excepted from the requirements of subpart I, Class 7 (Radioactive Materials).
- § 173.465 – PHMSA is proposing to exempt certain packages “not exceeding” 50 kg (110 lbs.) and 100 kg (220 lbs.) from the requirement to perform a free drop test.

3. Analysis of Environmental Impacts

NO ACTION ALTERNATIVE

If PHMSA were to select the No Action Alternative the HMR would remain unchanged, and no provisions would be amended or added. Any economic benefits gained through harmonization of the HMR with updated international consensus standards governing shipping of hazardous materials would not be realized. Under this alternative, PHMSA would not exempt

certain materials from regulatory requirements including certain package tests, storage requirements, and compliance with subpart I for certain specified fissile materials that PHMSA believes are not needed for safety.

Additionally, the No Action Alternative would not adopt enhanced and clarified regulatory requirements expected to maintain the high level of safety in transportation of hazardous materials provided by the HMR. As explained in the preamble to the NPRM, consistency between the HMR and current international standards can enhance safety by (1) ensuring that the HMR is informed by the latest best practices and lessons learned; (2) improving understanding of and compliance with pertinent requirements; (3) enabling consistent emergency response procedures in the event of a hazardous materials incident; and (4) facilitating the smooth flow of hazardous materials from their points of origin to their points of destination, thereby avoiding risks to the public and the environment from release of hazardous materials from delays or interruptions in the transportation of those materials. PHMSA would not capture those benefits if it declines to incorporate updated international standards into the HMR under the No Action Alternative.

PHMSA expects that the No Action Alternative could have a modest impact on GHG emissions. Because PHMSA expects the differences between the HMR and international standards for transportation of hazardous materials could result in transportation delays or interruptions, PHMSA anticipates that there could be modestly higher GHG emissions from some combination of (1) transfer of delayed hazardous materials to and from interim storage, (2) return of improperly shipped materials to their point of origin, and (3) reshipment of returned materials. PHMSA notes that it is unable to quantify such GHG emissions because of the difficulty in identifying the precise quantity or characteristics of such interim storage or returns/reshipments. PHMSA also submits that, to the extent that there are any delays arising from inconsistencies between the HMR and recently updated international standards, there could also be adverse impacts from the No Action Alternative for minority populations, low-income populations, or

other underserved and other disadvantaged communities.

Proposed Action Alternative

As described above, PHMSA is proposing the following changes to the HMR in this NPRM. While the following provisions are intended to reduce economic and logistical burdens, PHMSA also believes that these changes are justified by various studies and will not have a significant impact on safety.

- § 173.403 – PHMSA is proposing to remove the requirement for compliance with § 173.468, which requires the material to be insoluble or be intrinsically contained in a way that prevents leaching when placed in water. A paper submitted to IAEA which prompted this change showed that an inhalation dose under mechanical accident conditions of transport significantly depends on the physical form of the LSA material. The essential difference between LSA-II and LSA-III materials is that LSA-III is limited to solid material excluding powder. The results of the investigation conducted by the German authority who submitted the paper have shown that the amount of airborne material released following mechanical accident conditions of transport that could be inhaled is lower by at least a factor of 100 for LSA-III solids than for LSA-II solids in powder form. This much lower airborne release for LSA-III material due to its non-readily dispersible form compensates more than enough for its allowable 20-fold increase in average specific activity compared to LSA-II solid in powder form. Therefore, there is no need to take any credit from a leaching test to justify this allowable 20-fold increase in average specific activity between LSA-III and LSA-II, and the removal of this test will not lead to any decreases in safety or increases in radiation release or exposure.³¹
- 173.427 - PHMSA is proposing to add a new category of materials, SCO-III that were previously authorized for transport by special permit. The proposed language requires

³¹Büttner, Uwe, Frank Nitsche, Ingo Reiche, Bruno Desnoyers, and Florentint Lange. Working paper. *Review of LSA-II / LSA-III Concept – Deletion of the LSA-III Leaching Test*. Cologne, Germany, 2015.

that offerors of this material must provide an equivalent level of safety at least equivalent to that which would be provided if the SCO-III had been subjected to the test required in § 173.465(b), followed by the test required in § 173.465(e). The transport plan must also demonstrate that there would be no loss or dispersal of the radioactive contents and no more than a 20% increase in the maximum dose rate at any external surface of the object. The information confirming the equivalent level of safety must be compiled into a transport plan along with other info and be submitted to PHMSA for approval before every shipment of SCO-III. PHMSA can then determine if the shipment is safe enough to go forward. These measures will ensure that any SCO-III shipments do not impose undue risk to the public in transportation.

- §§ 173.435 and 173.436 - Adds various radionuclides to the “Table of A_1 and A_2 values for radionuclides” and the “Exempt material activity concentrations and exempt consignment activity limits for radionuclides” Table. This change allows for 7 new radionuclides to utilize their new unique A_1 and A_2 values instead of the generic values of tables 7 and 8 allowing for greater ease of shipment and removing the possible need for decay prior to shipment, the use of multiple Type A Packages, or the use of Type B packages, as well as leading to possible miscommunication of the relative hazards. While any increase in transportation of radioactive materials inherently increases the risk of release and exposure to radiation, the proposed limits in the tables of §§ 173.435 and 173.436 combined with the established HMR framework for transporting Class 7 (radioactive) maintain the existing level of safety and chance of exposure due to accidental release.
- § 173.453 Fissile materials—exceptions. PHMSA is proposing to add two entries, “uranium with enrichment up to 5 percent” and “fissile material with no more than 140 grams fissile nuclides” to the list of fissile materials excepted from the requirements of

subpart I for fissile materials, including the requirements of §§ 173.457 and 173.459, but are subject to all other requirements of this subpart.

Fissile materials present two potential risks. The first is radiation like any other Class 7, radioactive material. The second is the risk of the material going critical, which is unique to fissile materials. The fissile exempt materials of § 173.453 are not given an exemption from all of subpart I, just the fissile material requirements. Typically, these materials must be placed in a type A package. However, quantity specified in (g) is so small that NRC does not see any issues with radiation provided it is packaged as required. As for criticality, as stated in the preamble, the additional neutron absorption provided by uranium-238 in 5.0 weight percent enriched uranium compensates for the additional 1.5 grams of uranium-235 mass (i.e., up to 3.5 grams uranium-235 per package), when compared to the 49 CFR 173.453(a) limit of 2.0 grams.

As for paragraph (h), “fissile material with no more than 140 grams fissile nuclides,” this mass value, higher than that contained in IAEA SSR-6 (Rev. 1) paragraph 417(e) is justified, given the conservatism inherent in the exclusive use restriction of the SSR-6 (Rev. 1) provision and because plutonium-239 would have to be shipped in a Type B package that could withstand hypothetical accident conditions. Therefore, PHMSA and NRC propose a limit of 140 grams of fissile material. When determining the proposed limit, NRC considered uranium-235 rather than plutonium-239, as any amount of plutonium-239 over 0.435 grams is considered Type B, which would have to be packaged to withstand both normal and hypothetical accident conditions of transport. This limit is based on one fifth of a consensus minimum critical mass of uranium-235 under optimum conditions. This mass represents a conservative limit for fissile material, because five times this amount would remain subcritical under any conditions.

Because plutonium would not qualify for this exception, the NRC used uranium as the basis for their calculations. The packaging and exclusive use requirements make up for

the exception, and there is no risk of criticality, as it would take about five times more material for that to be a concern. For these reasons, based on the expertise of NRC and PHMSA, these changes will not cause an undue increase in risk of exposure.

- § 173.465 Type A packaging tests - This proposed change exempts certain packages “not exceeding” 50 kg (110 lbs.) for rectangular packages and 100 kg (220 lbs.) for cylindrical packages from the requirement to perform one of two free drop tests. This limitation on the corner drop test already exists in the HMR for Type-A packagings to contain non-fissile materials and for all packagings subject to the “normal conditions of transport” tests in NRC’s regulations in 10 CFR 71.71. PHMSA and NRC believe that it would be very unlikely for packages meeting those weight thresholds to undergo sustained corner or rim drops due to the weight of the package and how heavy packages are physically handled in the supply chain. Type A packagings below the given weight thresholds are still required to be capable of withstanding a drop from 1.2 meters (four feet) in a manner so as to suffer maximum damage to the safety features being tested.

As explained further in the discussion of the No Action Alternative, the preamble, and the PRIA, PHMSA anticipates the changes proposed under the Proposed Action Alternative will maintain the high safety standards currently achieved under the HMR. Harmonization of the HMR with updated international consensus standards is also expected to capture economic efficiencies gained from avoiding shipping delays and compliance costs associated with having to comply with divergent U.S. and international regulatory regimes for transportation of hazardous materials.

PHMSA expects that the Proposed Action Alternative could realize modest reductions in GHG emissions. Because PHMSA expects the differences between the HMR and international standards for transportation of hazardous materials could result in delays or interruptions, PHMSA anticipates that the No Action Alternative could result in modestly higher GHG

emissions from some combination of (1) transfer of delayed hazardous materials to and from interim storage, (2) return of improperly shipped materials to their point of origin, or (3) reshipment of returned materials. The Proposed Action Alternative avoids those risks resulting from divergence of the HMR from updated international standards. PHMSA notes, however, that it is unable to quantify any GHG emissions benefits because of the difficulty in identifying the precise quantity or characteristics of such interim storage or returns/re-shipments. PHMSA also submits that the Proposed Action Alternative would avoid any delayed or interrupted shipments arising from the divergence of the HMR from updated international standards under the No Action Alternative that could result in adverse impacts for minority populations, low-income populations, or other underserved and other disadvantaged communities.

4. Agency Consultation

PHMSA has coordinated with NRC in the development of this proposed rule. PHMSA will consider the views expressed in response to this Notice submitted by members of the public, state and local governments, industry, and any other interested stakeholders.

5. Proposed Finding of No Significant Impact

PHMSA expects the adoption of the Proposed Action Alternative's regulatory amendments will maintain the HMR's current high level of safety for shipments of hazardous materials transported by highway, rail, aircraft, and vessel, and as such finds the HMR amendments in the NPRM would have no significant impact on the human environment. PHMSA expects that the Proposed Action Alternative will avoid adverse safety, environmental justice, and GHG emissions impacts of the No Action Alternative. Furthermore, based on PHMSA's analysis of these provisions described above, PHMSA tentatively finds that codification and implementation of this rule would not result in a significant impact to the human environment.

PHMSA welcomes any views, data, or information related to environmental impacts that may result from NPRM's proposed requirements, the No Action Alternative, and other viable alternatives and their environmental impacts.

I. Privacy Act

In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform any amendments to the HMR considered in this rulemaking. DOT posts these comments, without edit, including any personal information the commenter provides, to www.regulations.gov, as described in the system of records notice (DOT/ALL-14 FDMS). DOT's complete Privacy Act Statement is in the Federal Register published on April 11, 2000,³² or on DOT's website at <http://www.dot.gov/privacy>.

J. Executive Order 13609 and International Trade Analysis

Executive Order 13609 ("Promoting International Regulatory Cooperation")³³ requires that agencies consider whether the impacts associated with significant variations between domestic and international regulatory approaches are unnecessary or may impair the ability of American business to export and compete internationally. In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

Similarly, the Trade Agreements Act of 1979 (Pub. L. 96-39), as amended by the Uruguay Round Agreements Act (Pub. L. 103-465) (as amended, the Trade Agreements Act), prohibits agencies from establishing any standards or engaging in related activities that create

³² 65 FR 19477 (Apr. 11, 2000).

³³ 77 FR 26413 (May. 4, 2012).

unnecessary obstacles to the foreign commerce of the United States. Pursuant to the Trade Agreements Act, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standards have a legitimate domestic objective, such as providing for safety, and do not operate to exclude imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

PHMSA participates in the establishment of international standards to protect the safety of the American public, and it has assessed the effects of the proposed rule to ensure that it does not cause unnecessary obstacles to foreign trade. In fact, the proposed rule is expected to facilitate international trade by harmonizing U.S. and international requirements for the transportation of hazardous materials. The rule is expected to reduce regulatory burdens and minimize delays arising from having to comply with divergent regulatory requirements. Accordingly, this rulemaking is consistent with Executive Order 13609 and PHMSA's obligations under the Trade Agreements Act.

K. Executive Order 12898 and Environmental Justice

Executive Orders 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"),³⁴ 13985 ("Advancing Racial Equity and Support for Underserved Communities Through the Federal Government"),³⁵ 13990 ("Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis"),³⁶ 14008 ("Tackling the Climate Crisis at Home and Abroad"),³⁷ and DOT Order 5610.2C ("Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations") require DOT agencies to achieve environmental justice as part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse

³⁴ 59 FR 7629 (Feb. 16, 1994).

³⁵ 86 FR 7009 (Jan. 25, 2021).

³⁶ 86 FR 7037 (Jan. 25, 2021).

³⁷ 86 FR 7619 (Feb. 1, 2021).

human health or environmental effects, including interrelated social and economic effects, of their programs, policies, and activities on minority populations, low-income populations, and other underserved and disadvantaged communities.

PHMSA has evaluated this proposed rule under the above Executive Orders and DOT Order 5610.2C and expects it would not cause disproportionately high and adverse human health and environmental effects on minority, low-income, underserved, and other disadvantaged populations, and communities. The proposed action may even reduce GHG emissions by reducing delays in transportation arising from having to comply with divergent regulatory requirements. The rulemaking is facially neutral and national in scope; it is neither directed toward a particular population, region, or community, nor is it expected to adversely impact any particular population, region, or community. And insofar as PHMSA expects the rulemaking would not adversely affect the safe transportation of hazardous materials generally, PHMSA does not expect the proposed revisions would entail disproportionately high adverse risks for minority populations, low-income populations, or other underserved and disadvantaged communities.

L. National Technology Transfer and Advancement Act

The National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) directs Federal agencies to use voluntary consensus standards in their regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards—e.g., specification of materials, test methods, or performance requirements—that are developed or adopted by voluntary consensus standard bodies. This rulemaking adopts the most current versions of multiple voluntary consensus standards which are discussed at length in the discussion in § 171.7. *See* SECTION 171.7 of the Section-by-Section Review for further details.

List of Subjects

49 CFR Part 171

Exports, Hazardous materials transportation, Hazardous waste, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

49 CFR Part 172

Education, Hazardous materials transportation, Hazardous waste, Labeling, Markings, Packaging, and containers, Reporting and recordkeeping requirements.

49 CFR Part 173

Hazardous materials transportation, Incorporation by reference, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 174

Hazardous materials transportation, Radioactive materials, Railroad safety.

49 CFR Part 175

Air carriers, Hazardous materials transportation, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 176

Hazardous materials transportation, Maritime carriers, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 177

Hazardous materials transportation, Motor carriers, Radioactive materials, Reporting and

recordkeeping requirements.

PHMSA proposes to amend 49 CFR Chapter I as follows:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

1. The authority citation for part 171 continues to read as follows:

Authority: 49 U.S.C. 5101-5128, 44701; Pub. L. 101-410 section 4; Pub. L. 104-134, section 31001; Pub. L. 114-74 section 4 (28 U.S.C. 2461 note); 49 CFR 1.81 and 1.97.

2. In § 171.7 revise paragraphs (d) and (s)(1) to read as follows:

§ 171.7 Reference material.

* * * * *

(d) American National Standards Institute, Inc., 25 West 43rd Street, New York, NY 10036, 212-642-4980, <https://ansi.org>.

(1) ANSI/ASHRAE 15-94, Safety Code for Mechanical Refrigeration, 1944, into §§ 173.306; 173.307.

(2) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 1971 Edition, into § 173.420.

(3) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 1982 Edition, into § 173.420.

(4) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 1987 Edition, into § 173.420.

(5) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 1990 Edition, into § 173.420.

(6) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 1995 Edition, into § 173.420.

(7) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 2001 Edition, into § 173.420.

(8) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 2012 Edition, into § 173.420.

(9) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 2019 Edition, into § 173.420.

* * * * *

(s) * * *

(1) IAEA Safety Standards for Protecting People and the Environment; Regulations for the Safe Transport of Radioactive Material; Specific Safety Requirements No. SSR-6 (Rev.1), (IAEA Regulations), 2018 Edition, into §§ 171.22; 171.23; 171.26; 173.403, 173.415; 173.416; 173.417; 173.435; 173.473.

* * * * *

**PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS,
HAZARDOUS MATERIALS COMMUNICATIONS, EMERGENCY RESPONSE
INFORMATION, TRAINING REQUIREMENTS, AND SECURITY PLANS**

3. The authority citation for part 172 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.96 and 1.97.

4. In § 172.101, revising in paragraph (1) the “Hazardous Materials Table” to read as follows:

§ 172.101 Purpose and use of hazardous materials table.

* * * * *

(1) * * *

§ 172.101 Hazardous Materials Table

[illegible]

5. In § 172.102, in paragraph (c)(1) revise “Special provision 139” to read as follows:

§ 172.102 Special provisions.

* * * * *

Code/Special Provisions

139 Use of the “special arrangement” proper shipping names for international shipments must be made under an IAEA Certificate of Competent Authority issued by the Associate Administrator in accordance with the requirements in §§ 173.471 or 173.473 of this subchapter. Use of these proper shipping names for domestic shipments may be made only under a DOT special permit, as defined in and in accordance with, the requirements of subpart B of part 107 of this subchapter.

* * * * *

6. In § 172.203, revise paragraphs (d)(4) through (6) to read as follows:

§ 172.203 Additional description requirements.

* * * * *

(d) * * *

(4) The category of label applied to each package or overpack in the shipment. For example: “RADIOACTIVE WHITE-I,” or “WHITE-I.”

(5) The transport index assigned to each package or overpack in the shipment bearing RADIOACTIVE YELLOW-II or RADIOACTIVE YELLOW-III labels.

(6) For a package containing fissile Class 7 (radioactive) material:

(i) The words “Fissile Excepted” if the package is excepted pursuant to § 173.453 of this subchapter; or otherwise.

(ii) The criticality safety index for the package and a list of the fissile nuclides contained

in the package.

* * * * *

7. In § 172.310, revise paragraphs (b) and (e) to read as follows:

§ 172.310 Class 7 (radioactive) materials.

* * * * *

(b) Each industrial, Type A, Type B(U), or Type B(M) package must be legibly and durably marked on the outside of the packaging, in letters at least 12 mm (0.47 in) high, with the words “TYPE IP-1,” “TYPE IP-2,” “TYPE IP-3,” “TYPE A,” “TYPE B(U),” or “TYPE B(M),” as appropriate. A package which does not conform to Type IP-1, Type IP-2, Type IP-3, Type A, Type B(U), or Type B(M) requirements may not be so marked. Any marking relating to the package type that does not relate to the UN number and proper shipping name assigned to a consignment shall be removed or covered prior to shipment.

* * * * *

(e) Each Type B(U), Type B(M), or fissile material package destined for export shipment must also be marked “USA” in conjunction with the specification marking, or other package certificate identification. (See §§ 173.471 and 173.473 of this subchapter.)

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

8. The authority citation for part 173 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.96, and 1.97.

9. In § 173.401, revise paragraph (b)(4) and add paragraph (6) to read as follows:

§ 173.401 Scope.

* * * * *

(b) * * *

(4) Natural material and ores containing naturally occurring radionuclides which may or may not have been processed, provided the activity concentration of the material does not exceed 10 times the exempt material activity concentration values specified in § 173.436, or determined in accordance with the requirements of § 173.433.

* * *

(6) Class 7 (radioactive) material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or contamination.

10. Amend § 173.403 by:

- a. Adding a definition for “Dose rate” in alphabetical order; and
- b. Revising the definitions for “Low Specific Activity (LSA) materials”, “Special form Class 7 (radioactive) material”, and “Surface Contaminated Object (SCO)”.

The additions and revisions read as follows:

§ 173.403 Definitions.

* * * * *

Dose rate See the definition of ***Radiation level*** in this section.

* * * * *

Low Specific Activity (LSA) material means Class 7 (radioactive) material with limited specific activity which is not fissile material or is excepted under § 173.453, and which satisfies the descriptions and limits set forth below. Shielding material surrounding the LSA material may not be considered in determining the estimated average specific activity of the LSA material. LSA material must be in one of three groups:

(1) LSA-I:

(i) Uranium and thorium ores, concentrates of uranium and thorium ores, and other ores

containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides; or

(ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, provided they are unirradiated and in solid or liquid form; or

(iii) Radioactive material for which the A_2 value is unlimited; or

(iv) Other radioactive material in which the activity is distributed throughout, and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in § 173.436 or calculated in accordance with § 173.433, or 30 times the default values listed in Table 8 of § 173.433.

(2) LSA-II:

(i) Water with tritium concentration up to 0.8 TBq/L (20.0 Ci/L); or

(ii) Other radioactive material in which the activity is distributed throughout, and the average specific activity does not exceed $10^{-4} A_2/\text{g}$ for solids and gases, and $10^{-5} A_2/\text{g}$ for liquids.

(3) LSA-III. Solids (e.g., consolidated wastes, activated materials, etc.), excluding powders, in which:

(i) The radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.); and

(ii) The estimated average specific activity of the solid, excluding any shielding material, does not exceed $2 \times 10^{-3} A_2/\text{g}$.

* * * * *

Special form Class 7 (radioactive) material means either an indispersible solid radioactive material or a sealed capsule containing radioactive material which satisfies the following conditions:

(1) It is either a single solid piece or a sealed capsule containing radioactive material that

can be opened only by destroying the capsule;

(2) The piece or capsule has at least one dimension not less than 5 mm (0.2 in); and

(3) It satisfies the test requirements of § 173.469. Special form encapsulations designed in accordance with the requirements of § 173.403 in effect from April 1, 1996 to [**date one-day prior to the effective date of the final rule**] may continue to be used when in compliance with a management system as required by IAEA Regulations (incorporated by reference; see § 171.7 of this subchapter) paragraph 306. There shall be no new manufacture of special form radioactive material to a design allowed by the regulations in effect prior to October 1, 2004. No new manufacture of special form radioactive material to a design allowed by the regulations in effect from October 1, 2004 to [**date one-day prior to the effective date of the final rule**] shall be permitted to commence after December 31, 2025. Any other special form encapsulation must meet the requirements of this paragraph (3).

* * * * *

Surface Contaminated Object (SCO) means a solid object which is not itself radioactive, but which has radioactive material distributed on its surface. SCO shall be in one of three groups:

(1) SCO-I: A solid object on which:

(i) The non-fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4 Bq/cm² (10⁻⁴ microcurie/cm²) for beta and gamma and low toxicity alpha emitters, or 0.4 Bq/cm² (10⁻⁵ microcurie/cm²) for all other alpha emitters;

(ii) The fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4 × 10⁴ Bq/cm² (1.0 microcurie/cm²) for beta and gamma and low toxicity alpha emitters, or 4 × 10³ Bq/cm² (0.1 microcurie/cm²) for all other alpha emitters; and

(iii) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 4

$\times 10^4$ Bq/cm² (1 microcurie/cm²) for beta and gamma and low toxicity alpha emitters, or 4×10^3 Bq/cm² (0.1 microcurie/cm²) for all other alpha emitters.

(2) SCO-II: A solid object on which the limits for SCO-I are exceeded and on which:

(i) The non-fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 400 Bq/cm² (10^{-2} microcurie/cm²) for beta and gamma and low toxicity alpha emitters, or 40 Bq/cm² (10^{-3} microcurie/cm²) for all other alpha emitters;

(ii) The fixed contamination on the accessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 8×10^5 Bq/cm² (20 microcurie/cm²) for beta and gamma and low toxicity alpha emitters, or 8×10^4 Bq/cm² (2 microcuries/cm²) for all other alpha emitters; and

(iii) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² (or the area of the surface if less than 300 cm²) does not exceed 8×10^5 Bq/cm² (20 microcuries/cm²) for beta and gamma and low toxicity alpha emitters, or 8×10^4 Bq/cm² (2 microcuries/cm²) for all other alpha emitters.

(3) SCO-III: A large solid object which, because of its size, cannot be transported in a type of package and for which:

(i) All openings are sealed to prevent release of radioactive material during conditions defined in § 173.427(d) of this subchapter;

(ii) The inside of the object is as dry as practicable;

(iii) The non-fixed contamination on the external surfaces do not exceed the limits specified in § 173.443 of this subchapter; and

(iv) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm² does not exceed 8×10^5 Bq/cm² (21 microcurie/cm²) for beta and gamma emitters and low toxicity alpha emitters, or 8×10^4 Bq/cm² (2 microcurie/cm²) for all other alpha emitters.

* * * * *

11. In § 173.410, revise paragraph (i)(3) and add paragraph (j) to read as follows:

§ 173.410 General design requirements.

* * * * *

(i) * * *

(3) A package containing radioactive material must be capable of withstanding, without loss or dispersal of radioactive contents from the containment system, an internal pressure that produces a pressure differential of not less than the maximum normal operating pressure plus 95 kPa (13.8 psi).

(j) The effect of aging mechanisms (e.g., corrosion, abrasion, fatigue, crack propagation, changes of material compositions or mechanical properties due to thermal loadings or radiation, generation of decomposition gas, etc.) and their impact on the functions important to safety is considered.

12. In § 173.415, revise paragraphs (a)(1) and (2) to read as follows:

§ 173.415 Authorized Type A packages.

* * * * *

(a) * * *

(1) A description of the package showing materials of construction, dimensions, weight, closure, closure materials (including gaskets, tape, etc.) of each item of the containment system, shielding, and packing materials used in normal transportation; a description of the authorized contents (including radionuclide(s), the radionuclide(s) activity limits, the radionuclide(s) physical and chemical state, and an indication if the content must be special form); and at least one of the following:

(i) If the packaging is subjected to the physical tests of § 173.465—and if applicable,

§ 173.466—documentation of testing including: date; place of test; signature of testers; a description of each test performed, including equipment used, and the damage to each item of the containment system resulting from the tests; a description of how the tested contents meet the requirements of § 173.461(a)(1); and an analysis of how the test results demonstrate compliance with § 173.412(j) for the contents being shipped, or

(ii) For any other demonstration of compliance with tests authorized in § 173.461, a detailed analysis which shows that, for the contents being shipped, the package meets the pertinent design and performance requirements for a DOT Specification 7A Type A package.

(2) If the offeror has obtained the packaging from another person who meets the definition of “packaging manufacturer” in § 178.350(c) of this subchapter, a description of the authorized contents (including radionuclide(s), the radionuclide(s) activity limits, the radionuclide(s) physical and chemical state, and an indication of whether the content must be special form) and a certification from the packaging manufacturer that the package meets all of the requirements of §§ 173.403, 173.410, 173.412, 173.465, and, if applicable, § 173.466, for the radioactive contents presented for transport. If requested by DOT, the offeror shall contact the packaging manufacturer and have the packaging manufacturer provide DOT a copy of documents maintained by the packaging manufacturer that meet the requirements of paragraph (a)(1) of this section.

* * * * *

13. In § 173.417, revise paragraph (a) to read as follows:

§ 173.417 Authorized fissile materials packages.

(a) Except as provided in § 173.453, fissile materials containing not more than A_1 or A_2 as appropriate, must be packaged in one of the following packagings:

(1) For domestic shipments—

(i) Any packaging listed in § 173.415, limited to the Class 7 (radioactive) materials

specified in 10 CFR part 71, subpart C; or

(ii) Any Type AF, Type B(U)F, or Type B(M)F packaging that meets the applicable standards for fissile material packages in 10 CFR part 71.

(2) For import or export shipments—

(i) Any Type AF, Type B(U)F, or Type B(M)F packaging that meets the applicable requirements for fissile material packages in Section VI of the International Atomic Energy Agency “Regulations for the Safe Transport of Radioactive Material, IAEA Regulations (incorporated by reference, see § 171.7 of this subchapter),” and for which the foreign Competent Authority certificate has been revalidated by the U.S. Competent Authority, in accordance with § 173.473; or

(ii) Packaging that meets the applicable standards for fissile material packages in paragraph 674 of IAEA Regulations (incorporated by reference, see § 171.7 of this subchapter).

(3) A residual “heel” of enriched solid uranium hexafluoride may be transported without a protective overpack in any metal cylinder that meets both the requirements of §§ 173.415 and 178.350 of this subchapter for Specification 7A Type A packaging, and the requirements of § 173.420 for packagings containing greater than 0.1 kg of uranium hexafluoride. Any such shipment must be made in accordance with Table 2, as follows:

Table 2 - Allowable Content of Uranium Hexafluoride (UF₆ “Heel” in a Specification 7A Cylinder)

| Maximum cylinder diameter | | Cylinder volume | | Maximum Uranium 235-enrichment (weight) percent | Maximum “Heel” weight per cylinder | | | |
|---------------------------|--------|-----------------|--------------------|---|------------------------------------|------------|-----------------|------|
| Centimeters | Inches | | | | Liters | Cubic feet | UF ₆ | |
| | | kg | lb | | | | kg | lb |
| 12.7 | 5 | 8.8 | 0.311 | 100.0 | 0.045 | 0.1 | 0.031 | 0.07 |
| 20.3 | 8 | 39.0 | 1.359 | 12.5 | 0.227 | 0.5 | 0.019 | 0.04 |
| 30.5 | 12 | 68.0 | 2.410 | 5.0 | 0.454 | 1.0 | 0.015 | 0.03 |
| 76.0 | 30 | 725.0 | 25.64 | 5.0 | 11.3 | 25.0 | 0.383 | 0.84 |
| 122.0 | 48 | 3084.0 | 108.9 ¹ | 4.5 | 22.7 | 50.0 | 0.690 | 1.52 |
| 122.0 | 48 | 4041.0 | 142.7 ² | 4.5 | 22.7 | 50.0 | 0.690 | 1.52 |

¹ 10 ton.

² 14 ton.

* * * * *

14. In § 173.420, revise paragraph (a)(2)(i) and add paragraph (f) to read as follows:

§ 173.420 Uranium hexafluoride (fissile, fissile excepted, and non-fissile).

(a) * * *

(2) * * *

(i) American National Standards Institute (ANSI) N14.1 (incorporated by reference, see § 171.7 of this subchapter) in effect at the time the packaging was manufactured; or

* * * * *

(f) Packagings containing 0.1 kg or more of non-fissile or fissile-excepted uranium hexafluoride must meet the requirements of § 173.477.

15. In § 173.424, revise paragraph (h) to read as follows:

§ 173.424 Excepted packages for radioactive instruments and articles.

* * * * *

(h) The package does not contain fissile material unless excepted by § 173.453; and

* * * * *

16. Amend § 173.427 by:

- a. Revising paragraphs (a)(2) and (a)(6)(i);
- b. Redesignating paragraphs (d) and (e) as paragraphs (e) and (f); and
- c. Adding paragraph (d).

The additions and revisions read as follows:

§ 173.427 Transport requirements for low specific activity (LSA) Class 7 (radioactive) material and surface contaminated objects (SCO).

(a) * * *

(2) The quantity of LSA material and SCO-I and II transported in any single conveyance may not exceed the limits specified in Table 5. For SCO-III, the limits in Table 5 may be exceeded only if the SCO-III is subject to a transport plan that contains precautions to be employed during transport to obtain an overall level of safety at least equivalent to that which would be provided if the limits had been applied.

* * * * *

(6) * * *

(i) Except for SCO-III transported according to a transport plan, shipments must be loaded by the consignor and unloaded by the consignee from the conveyance or freight container in which originally loaded;

* * * * *

(d) For SCO-III—

(1) Transport shall be under exclusive use by road, rail, inland waterway, or sea.

(2) Stacking shall not be permitted.

(3) All activities associated with the shipment, including radiation protection, emergency response, and any special precautions or special administrative or operational controls that are to be employed during transport, shall be described in the transport plan. The transport plan shall demonstrate that the overall level of safety in transport is at least equivalent to that which would be provided if the SCO-III had been subjected to the test required in § 173.465(b), followed by the test required in § 173.465(e). The transport plan must also demonstrate that there would be no loss or dispersal of the radioactive contents and no more than a 20% increase in the maximum dose rate at any external surface of the object.

(4) The requirements of § 173.411(b)(2) for a Type IP-2 package shall be satisfied, except that the maximum damage referred to in § 173.465(c) may be determined based on provisions in the transport plan and the requirements of § 173.465(d) are not applicable.

(5) The object and any shielding are secured to the conveyance in accordance with

§ 173.410(a).

(6) The shipment shall be subject to approval by the Associate Administrator, and each request for SCO-III shipment approval must be submitted in writing to the Associate Administrator. An application for approval of SCO-III shipments shall include:

(i) A statement of the respects in which, and of the reasons why, the consignment is considered SCO-III.

(ii) Justification for choosing SCO-III by demonstrating that:

(A) No suitable packaging currently exists.

(B) Designing and/or constructing a packaging or segmenting the object is not practically, technically, or economically feasible.

(C) No other viable alternative exists.

(iii) A detailed description of the proposed radioactive contents with reference to their physical and chemical states and the nature of the radiation emitted.

(iv) A detailed statement of the design of the SCO-III, including complete engineering drawings and schedules of materials and methods of manufacture.

(v) All information necessary to demonstrate that the requirements of § 173.427(d)(1)-(5) and the requirements of § 173.427(a)(2), if applicable, are satisfied.

(vi) The transport plan.

(vii) A specification of the applicable quality assurance program.

* * * * *

17. In § 173.431, revise paragraph (b) to read as follows:

§ 173.431 Activity limits for Type A and Type B packages.

* * * * *

(b) The limits on activity contained in a Type B(U) or Type B(M) package are those prescribed in the applicable approval certificate under §§ 173.471 or 173.473.

18. In § 173.433, add paragraph (i) to read as follows:

§ 173.433 Requirements for determining basic radionuclide values, and for the listing of radionuclides on shipping papers and labels.

* * * * *

(i) For instruments or articles in which the radioactive material is enclosed in or included as a component part of the instrument or article and which meets paragraph (e) of § 173.424 of the subchapter, alternative values to those in the table in 173.436 for the activity limit for an exempt consignment may be used provided they are first approved by the Associate Administrator, or, for international transport, multilateral approval is obtained from the pertinent Competent Authorities.

19. Amend § 173.435, in the table by:

- a. Adding entries for “Ba-135m”, “Ge-69”, “Ir-193m”, “Ni-57”, “Sr-83”, “Tb-149” and “Tb-161” in alphanumeric order; and
- b. Revising the entry for “Rb(nat)”.

The additions and revisions read as follows:

§ 173.435 Table of A_1 and A_2 values for radionuclides.

The table of A_1 and A_2 values for radionuclides is as follows:

| Symbol of radionuclide | Element and atomic number | A_1 (TBq) | A_1 (Ci) ^b | A_2 (TBq) | A_2 (Ci) ^b | Specific activity | |
|------------------------|---------------------------|-------------------|-------------------------|----------------------|-------------------------|-------------------|-------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| ADD | | | | | | | |
| * | * | * | * | * | * | * | * |
| Ba-135m | | 2.0×10^1 | 5.4×10^2 | 6.0×10^{-1} | 1.6×10^1 | 3.0×10^4 | 8.1×10^5 |
| * | * | * | * | * | * | * | * |
| Ge-69 | | 1.0×10^0 | 2.7×10^1 | 1.0×10^0 | 2.7×10^1 | 4.3×10^4 | 1.2×10^6 |
| * | * | * | * | * | * | * | * |
| Ir-193m | | 4.0×10^1 | 1.1×10^3 | 4.0×10^0 | 1.1×10^2 | 2.4×10^3 | 6.4×10^4 |
| * | * | * | * | * | * | * | * |

| | | | | | | | |
|---------|--------------|----------------------|-------------------|----------------------|-------------------|-----------------------|----------------------|
| Ni-57 | Nickel (28) | 6.0×10^{-1} | 1.6×10^1 | 5.0×10^{-1} | 1.4×10^1 | 5.7×10^4 | 1.5×10^6 |
| * | * | * | * | * | * | * | * |
| Sr-83 | | 1.0×10^0 | 2.7×10^1 | 1.0×10^0 | 2.7×10^1 | 4.3×10^4 | 1.2×10^6 |
| * | * | * | * | * | * | * | * |
| Tb-149 | Terbium (65) | 8.0×10^{-1} | 2.2×10^1 | 8.0×10^{-1} | 2.2×10^1 | 1.9×10^5 | 5.1×10^6 |
| * | * | * | * | * | * | * | * |
| Tb-161 | | 3.0×10^1 | 8.1×10^2 | 7.0×10^{-1} | 1.9×10^1 | 4.3×10^3 | 1.2×10^5 |
| * | * | * | * | * | * | * | * |
| REVISE | | | | | | | |
| * | * | * | * | * | * | * | * |
| Rb(nat) | | Unlimited | Unlimited | Unlimited | Unlimited | 6.7×10^{-10} | 1.8×10^{-8} |
| * | * | * | * | * | * | * | * |

* * * *

20. Amend § 173.436, in the table by:

a. Adding entries for “Ba-135m”, “Ge-69”, “Ir-193m”, “Ni-57”, “Sr-83”, “Tb-149” and “Tb-161” in alphanumeric order; and

b. Revising the notes section after the table.

The additions and revisions read as follows:

§ 173.436 Exempt material activity concentrations and exempt consignment activity limits for radionuclides.

The Table of Exempt material activity concentrations and exempt consignment activity limits for radionuclides is as follows:

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| | | | | | |
| ADD | | | | | |
| * | * | * | * | * | * |
| Ba-135m | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |

| | | | | | |
|---------|-----------------|-------------------|-----------------------|-------------------|----------------------|
| * | * | * | * | * | * |
| Ge-69 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| * | * | * | * | * | * |
| Ir-193m | | 1.0×10^4 | 2.7×10^{-7} | 1.0×10^7 | 2.7×10^{-4} |
| * | * | * | * | * | * |
| Ni-57 | Nickel (28) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| * | * | * | * | * | * |
| Sr-83 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| * | * | * | * | * | * |
| Tb-149 | Terbium (65) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| * | * | * | * | * | * |
| Tb-161 | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^6 | 2.7×10^{-5} |
| * | * | * | * | * | * |

^a [Reserved]

^b Parent nuclides and their progeny included in secular equilibrium are listed as follows:

Sr-90: Y-90

Zr-93: Nb-93m

Zr-97: Nb-97

Ru-106: Rh-106

Ag-108m: Ag-108

Cs-137: Ba-137m

Ce-144: Pr-144

Ba-140: La-140

Bi-212: Tl-208 (0.36), Po-212 (0.64)

Pb-210: Bi-210, Po-210

Pb-212: Bi-212, Tl-208 (0.36), Po-212 (0.64)

Rn-222: Po-218, Pb-214, Bi-214, Po-214

Ra-223: Rn-219, Po-215, Pb-211, Bi-211, Tl-207

Ra-224: Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64),

Ra-226: Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210

Ra-228: Ac-228

Th-228: Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)

Th-229: Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209

Th-nat*: Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)

Th-234: Pa-234m

U-230: Th-226, Ra-222, Rn-218, Po-214

U-232: Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)

U-235: Th-231

U-238: Th-234, Pa-234m

U-nat*: Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210

Np-237: Pa-233

Am-242m: Am-242

Am-243: Np-239

* in the case of Th-natural, the parent nuclide is Th-232, in the case of U-natural the parent nuclide is U-238.

^c [Reserved]

^d These values apply only to compounds of uranium that take the chemical form of UF₆, UO₂F₂ and UO₂(NO₃)₂ in both normal and accident conditions of transport.

^e These values apply only to compounds of uranium that take the chemical form of UO₃, UF₄, UCl₄ and hexavalent compounds in both normal and accident conditions of transport.

^f These values apply to all compounds of uranium other than those specified in notes (d) and (e) of this table.

^g These values apply to unirradiated uranium only.

21. In § 173.443, revise paragraph (c) to read as follows:

§ 173.443 Contamination control.

* * * * *

(c) Except as provided in paragraphs (a) and (d) of this section, each conveyance,

overpack, freight container, tank, or intermediate bulk container used for transporting Class 7 (radioactive) materials as an exclusive use shipment that utilizes the provisions of paragraph (b) of this section, § 173.427(b)(4), § 173.427(c), or § 173.427(d) must be surveyed with appropriate radiation detection instruments after each exclusive use transport. Except as provided in paragraphs (a) and (d) of this section, these items may not be returned to Class 7 (radioactive) materials exclusive use transport service, and then only for a subsequent exclusive use shipment utilizing one of the above cited provisions, unless the radiation dose rate at each accessible surface is 0.005 mSv per hour (0.5 mrem per hour) or less, and there is no significant non-fixed surface contamination as specified in paragraph (a) of this section. The requirements of this paragraph do not address return to service of items outside of the above cited provisions.

* * * * *

22. In § 173.447, redesignate paragraph (b) as paragraph (c) and add paragraph (b) to read as follows:

§ 173.447 Storage incident to transportation—general requirements.

* * * * *

(b) The number of packages, overpacks, and freight containers containing Class 7 (radioactive) material being stored in transit in any one storage area must be so limited that the total sum of the transport indexes in any group of packages, overpacks, or freight containers does not exceed 50. Groups of packages must be situated so as to maintain a spacing of at least 6 m (20 ft) between the closest surfaces of packages, overpacks, or freight containers from any two groups.

* * * * *

23. In § 173.448, revise paragraph (g)(2) to read as follows:

§ 173.448 General transportation requirements.

* * * * *

(g) * * *

(2) The overpack must be marked as prescribed in subpart D of part 172 of this subchapter and § 173.25(a). Overpacks must be marked with the consignor or consignee's name and address, unless the name and address of the consignor or consignee of each package contained in the overpack are visible; and

* * * * *

24. In § 173.453, revise the introductory text and paragraph (d), and add paragraphs (g) and (h) to read as follows:

§ 173.453 Fissile materials—exceptions.

Fissile materials meeting the requirements of at least one of the paragraphs (a) through (h) of this section are excepted from the requirements of this subpart for fissile materials, including the requirements of §§ 173.457 and 173.459, but are subject to all other requirements of this subpart, except as noted.

* * * * *

(d) Uranium enriched in uranium-235 to a maximum of 1 percent by weight, and with total plutonium and uranium-233 content of up to 1 percent of the mass of uranium-235, provided that the mass of any beryllium, graphite, and hydrogenous material enriched in deuterium constitutes less than 5 percent of the uranium mass, and that the fissile material is distributed homogeneously and does not form a lattice arrangement within the package.

* * * * *

(g) Uranium with enrichment up to 5 percent by weight uranium-235, up to 3.5 g uranium-235 per package.

(h) Fissile material with no more than 140 grams fissile nuclides shipped under exclusive use.

25. In § 173.465, revise paragraph (c)(2) to read as follows:

§ 173.465 Type A packaging tests.

* * * * *

(c) * * *

(2) For packages containing fissile material, the free drop test specified in paragraph (c)(1) of this section must be preceded by a free drop from a height of 0.3 m (1 foot) on each corner, or in the case of cylindrical packages, onto each of the quarters of each rim. This free drop test applies only to fissile material rectangular packages not exceeding 50 kg (110 lbs.) and fissile material cylindrical packages not exceeding 100 kg (220 lbs.).

* * * * *

§ 173.468 [Removed and Reserved]

26. Remove and reserve § 173.468.

§ 173.472 [Removed and Reserved]

27. Remove and reserve § 173.472.

28. In § 173.475, add paragraph (j) to read as follows:

§ 173.475 Quality control requirements prior to each shipment of Class 7 (radioactive) materials.

* * * * *

(j) For packages to be shipped after storage, all packaging components and radioactive contents have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of this subchapter and in the applicable certificates of approval have been fulfilled.

29. The authority citation for Part 174 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 33 U.S.C. 1321; 49 CFR 1.81 and 1.97.

30. In § 174.750, revise paragraph (a) to read as follow:

§ 174.750 Incidents involving leakage.

(a) In addition to the incident reporting requirements of §§ 171.15 and 171.16 of this subchapter, the carrier shall also notify the offeror at the earliest practicable moment following any incident in which there has been breakage, spillage, or suspected radioactive contamination involving Class 7 (radioactive) materials shipments. Transport vehicles, buildings, areas, or equipment in which Class 7 (radioactive) materials have been spilled may not be again placed in service or routinely occupied until the radiation dose rate at every accessible surface is less than 0.005 mSv per hour (0.5 mrem per hour) and there is no significant removable radioactive surface contamination (see § 173.443 of this subchapter). If it is evident that a package of radioactive material or conveyance carrying unpackaged radioactive material is leaking, or if it is suspected that a package of radioactive material or conveyance carrying unpackaged radioactive material may have leaked, the actions required by § 173.443(e) of this subchapter must be taken.

* * * * *

PART 175—CARRIAGE BY AIRCRAFT

31. The authority citation for Part 175 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81 and 1.97.

32. In § 175.705, revise paragraph (b) to read as follows:

§ 175.705 Radioactive contamination.

* * * * *

(b) When contamination is present or suspected, the package containing a Class 7

material, any loose Class 7 material, associated packaging material, and any other materials that have been contaminated must be segregated as far as practicable from personnel contact until radiological advice or assistance is obtained from the U.S. Department of Energy or appropriate State or local radiological authorities. If it is evident that a package of radioactive material or conveyance carrying unpackaged radioactive material, is leaking, or if it is suspected that a package of radioactive material or conveyance carrying unpackaged radioactive material, may have leaked, the actions required by § 173.443(e) of this subchapter must be taken.

* * * * *

PART 176—CARRIAGE BY VESSEL

33. The authority citation for Part 176 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 49 CFR 1.81 and 1.97.

34. Revise § 176.715 to read as follows:

§ 176.715 Contamination control.

Each hold, compartment, or deck area used for the transportation of low specific activity or surface contaminated object Class 7 (radioactive) materials under exclusive use conditions in accordance with § 173.427(b)(4) or (c) must be surveyed with appropriate radiation detection instruments after each use. Such holds, compartments, and deck areas may not be used again for Class 7 (radioactive) materials exclusive use transport service, and then only for a subsequent exclusive use shipment utilizing the provisions of § 173.427(b)(4) or (c) until the radiation dose rate at every accessible surface is less than 0.005 mSv/h (0.5 mrem/h), and the non-fixed contamination is not greater than the limits prescribed in § 173.443(a) of this subchapter. If it is evident that a package of radioactive material or conveyance carrying unpackaged radioactive material, is leaking, or if it is suspected that a package of radioactive material or conveyance carrying unpackaged radioactive material, may have leaked, the actions required by § 173.443(e)

of this subchapter must be taken.

PART 177—CARRIAGE BY PUBLIC HIGHWAY

35. The authority citation for Part 177 continues to read as follows:

Authority: 49 U.S.C. 5101-5128; sec. 112 of Pub. L. 103-311, 108 Stat. 1673, 1676 (1994); sec. 32509 of Pub. L. 112-141, 126 Stat. 405, 805 (2012); 49 CFR 1.81 and 1.97.

36. In § 177.843, revise paragraph (c) to read as follows:

§ 177.843 Contamination of vehicles.

* * * * *

(c) In case of fire, accident, breakage, or unusual delay involving shipments of Class 7 (radioactive) material, see §§ 171.15, 171.16, and 177.854 of this subchapter. If it is evident that a package of radioactive material or conveyance carrying unpackaged radioactive material, is leaking, or if it is suspected that a package of radioactive material or conveyance carrying unpackaged radioactive material, may have leaked, the actions required by § 173.443(e) of this subchapter must be taken.

* * * * *

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